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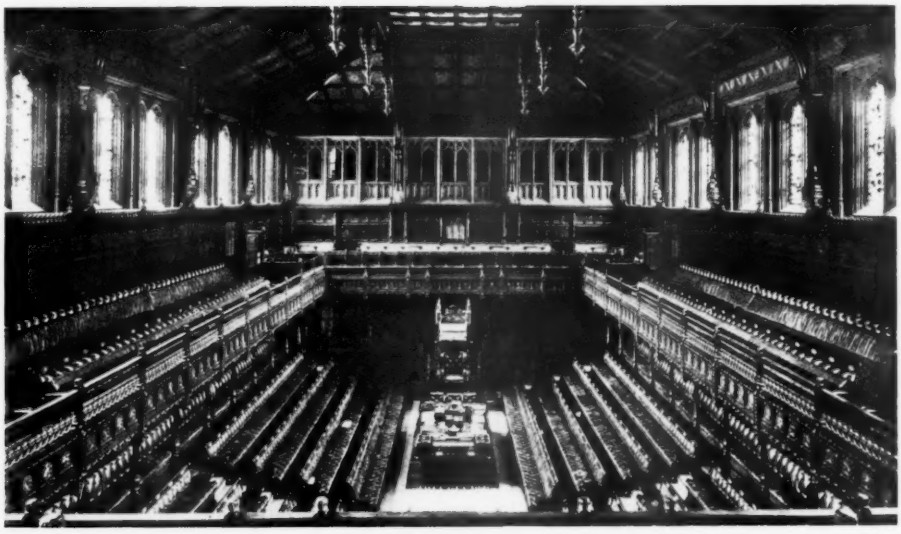


THE EXISTING HOUSE OF COMMONS

Planning for Good Acoustics

BY HOPE BAGENAL [*A.*]

[*Read before the Royal Institute of British Architects on Monday, 17 November 1924.*]

OUR past president, Mr. Paul Waterhouse, in his address of November, 1922, referred to the problem of acoustics in the following words: "But after all the best buildings for sound seem to be those in which echo is made our friend and not our foe; buildings in which, as in old Exeter Hall, echo was timed to reinforce every syllable instead of fighting for dear life with the succeeding one, or possibly the next word."

I would like in this paper* to carry forward the idea behind his thoughtful words and suggest how to regulate our dealings with *Echo*. There is no reason indeed why that nymph, when given a good home, should answer back as is her habit near woods and on the edge of moist river lawns. Within four walls she can be tamed and instead of striving with her companion can readily be induced to reinforce his words in a well-timed assent. But much depends on the distance she sits from her looking-glass. She will use walls, floor and ceiling if she is permitted and dearly likes a good dome. But the art of the designer lies in confining her glances to certain surfaces.

This can perhaps be made clearer if we define Echo simply as the image of a sound, and her mirror as any hard, smooth, rigid surface occurring anywhere in the building. Let us consider these mirrors in three main types of buildings. I propose to refer only occasionally to the theoretical side. Mr. G. A. Sutherland has dealt very clearly with the elements of the subject in his excellent papers published in the R.I.B.A. JOURNAL in 1923. I want to apply the principles enunciated by him to some historical and modern types:—

* Previous papers laid before the Institute on this subject are as follows:—Roger Smith, T., "On Acoustics," TRANSACTIONS, December, 1860; Statham, H. H., "Architecture Practically Considered in Relation to Music," TRANSACTIONS, 1873, p. 81; Burrows, H. W., "Sound in its Relation to Building," JOURNAL, March 28, 1895.

Open-air Theatres.—The classic theatre has many vital lessons in acoustic planning. The Greek type was a very highly developed acoustic instrument; the Roman was less excellent. The excellence of the Greek theatre was due to three contributing factors :—

(1) The sound was intensified near the source by a number of useful reflections.

(2) The passage from speaker to listener was kept clear and free from obstacles.

(3) The sound had a clear passage from speaker to listener and reached the listener at a wide angle.

In Fig. 1 the Greek and the Roman theatres are compared. The characteristics of the Greek are the high, narrow *logeion* or stage platform (conceded to be ten or twelve feet high at Epidaurus and Priene); the skene wall behind this; and the large paved orchestra area in front of it.* These points are, of course, controversial; but I want here to look at the evidence from the acoustic point of view.

The useful reflections from these surfaces are shown on the Greek section, Fig. 1. The small depth of the stage and, therefore, the nearness of the players to their back wall, ensured its efficiency as a reflector. The height of the stage above the orchestra level gave reflections at a useful angle from the paved area below. There was also the floor of the stage giving reflections less useful.

The height of the stage also gave a wide angle of impact to the direct sound from player to audience. This is especially important when there are no reflections from the ceiling. Sound passing over human heads at a small angle is rapidly absorbed. Therefore, the wider the angle of impact the better. The plan of the classic theatre ensured an equal distribution of sound in all directions, and the section in the case of the Greek theatre was usually without reflecting surfaces likely to cause even local interference. Vitruvius says explicitly in Book V. (3): "In short, the building should be so contrived that a line drawn from the first to the last step should touch the front angle of the top of all the seats, in which case the voice meets with no impediment."

* Authorities, Durm, J., *Die Baukunst der Griechen*, 1910 edition, section on theatres, p. 454; Moritz, E., *Das Antike Theater*, 1910, section on acoustics, p. 35; also see Professor E. A. Gardner's summing up of the general evidence in his *Glory of the Greek and Roman Theatre*, "Wonders of the Past" series, part 23, 1923.

The information given in Vitruvius, Book V., however obscure in parts, is obviously the result of a long and intelligent tradition in applied acoustics. Even including the obscure parts, his fifth book still remains one of the few textbooks on the subject which cannot be ignored.

Also, since there was no roof to the Greek theatre, the reverberation was nearly as short as in the open air.

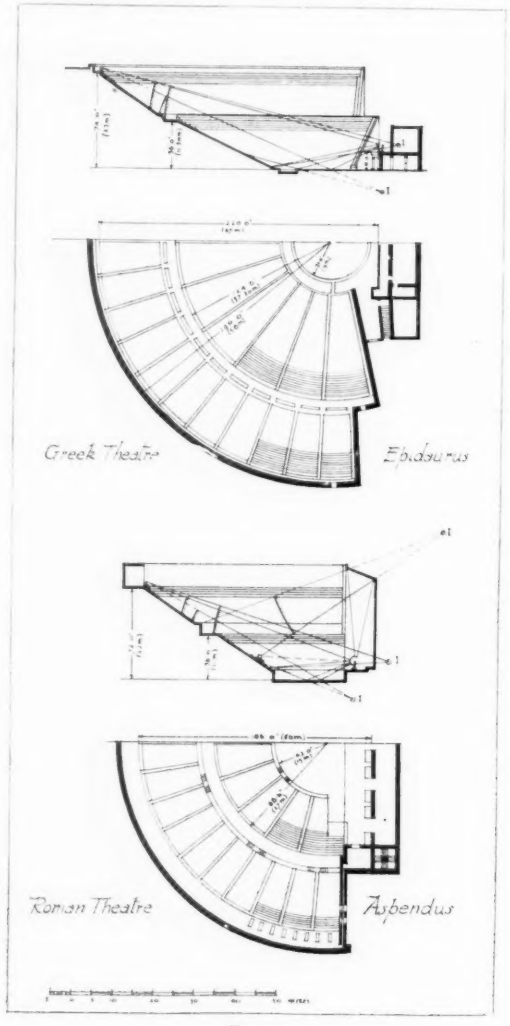


FIG. 1

Use of Resonators in a Greek Theatre.—But the fact that there was no reverberation meant that the energy condition was low. The size of the classic theatres was enormous, seating as many as sixteen to twenty thousand people. The rear seats were sometimes at a distance of more than two hundred feet from the stage. All possible reinforcements were therefore desirable. A method of reinforcing by resonance was probably secured by the following means. The wood floor of the stage in contact with the feet of the player acted as a resonating surface. In addition to the stage floor were the *pinakes** or wooden panels placed between stone columns in the supporting wall of the stage. Rebates for these are still to be seen. Each wooden panel in this position would undoubtedly reinforce the sound, and specially so if in contact with the floor of the logeion. The declamation of the players was a kind of rhythmical shouting or chanting, and probably required considerable training. The frequent and sonorous vowel sounds of the Greek tongue, produced as musical tones, conveyed the sense to the remotest seats. Stage floor and " pinakes " together formed the sound-box. The players performed not only upon the logeion or stage platform but on the theologeion above and upon the orchestra below. The painting on the wall of the Necropolis at Cyrene shows the three players upon the orchestra floor with chorus round them. They are standing upon low rectangular objects having small square openings. Donaldson† takes these to be the soles of the buskins of the players, the small square being the division between the two. In my opinion they are what they appear to be, namely, rectangular sound-boxes, having openings towards the audience. The players upon the orchestra level would require wood rather than a stone surface to stand upon in order to give the same full tone to their voices which they could command upon the logeion above.

These points in acoustic design have a direct bearing upon modern problems. A hard rear wall some ten feet behind the speaker may make considerable difference to audibility in the case of a large hall or in the case of a pulpit. The usefulness of the stage floor as a reflector is one of the factors which make the difference between the opera house and the concert room. The upper galleries of Covent Garden rely greatly upon the stage floor, and it is well known that the speaking voice can be heard well there. A concert room would be improved by a clear, hard floor space round the singer or solo instrument. It is bad design to bring orchestral instruments or platform seats close up to solo performers. A clear orchestra area (such as was required in the National Theatre competition recently held) immediately in front of the Albert Hall platform would increase the useful sound to galleries.

Wood surfaces could also be used advantageously as resonators. They should be in contact with the singer or instrument. The wood surface of the platform floor should be jointed to the front of the platform which would then act like the Greek pinakes ; and the same principle could be applied to the wood panelling of the platform recess. A powerful singer is really an instrument in contact with the floor. Resonating surfaces increase his power : and they are specially useful for musical instruments like 'cellos and double-basses.

There was one characteristic of the modern auditory lacking in the classic theatre, namely, a certain fullness of musical tone due to reverberation. The lack of this must have been felt as the dimensions of the theatre increased. Two attempts were made to compensate for this. The Greek system of *echeia* was an attempt to place resonators in the form of enclosed volumes of air responding to tones in the neighbourhood of the audience. The fact of these echeia is disputed, and no vases corresponding to those described in the Vth Book of Vitruvius have been actually found. The only evidence which I consider important (outside Vitruvius's writings) is the fact that (1) thirteen compartments corresponding to those allocated by Vitruvius are to be found in the ruins of the theatre at Aizani, and (2) that a tradition of acoustic pottery seems to have continued into the Middle Ages. The place in the mediæval church selected for their use appears to have been the sleeper walls under the choir stalls. They were found in these positions in St. Nicholas,

* *Pinakes.* See Durm (J.), *Die Baukunst der Griechen*, p. 482 : " If we decide to understand under ' pinakes ' thin intercolumniations of wood which could be put in or taken out, or again, if we choose to assume in place of them three-sided revolving prisms (periakti) with decorations painted thereon, this is open to anyone, but nothing is proved thereby. The rebates on the stone supports strengthen the view that panels with fastenings were put in there."

† Donaldson (J. W.), *The Theatre of the Greeks*, p. 285.

Ipswich ; St. Peter's, Mancroft, Norwich ; and St. Peter's Mountergate, Norwich.*

Many other examples exist of pots found in chancel walls, but the three I have named appear to be more probably for acoustic purposes than for any other. Vitruvius in a significant passage says that theatres built of wood do not require the system of echeia.

The second attempt to get a fuller tone is seen in the Roman stage roof.

In the Roman theatre the stage was lower and was brought forward so that the orchestra became a semi-circle. The great width of the classic stage of this shape must have constituted a danger. Echoes would certainly be returned from wing walls. In these walls the periakti may have been placed—a series of prisms, triangular on plan, rotating upon an axis and providing three sets of scenery. If the line of these periakti was placed at an angle of 45 deg. to the stage the actor's voice would be reflected out into the hemicycle. Vitruvius mentions the practice of the singers to the flute turning towards the " scenæ valvas " (some part of stage scenery) in order to project their voices. In the Roman theatre the orchestra space was frequently used for seats. The reflecting surface thus sacrificed was partly compensated for by the extra floor area of the stage. But an important addition occurs in the Roman theatre from an acoustic point of view, namely, the roof set at an angle above the stage. Yet the reflections from this roof would not have given the " consonance " recommended by Vitruvius. At Aspendus the sound beam from the roof would have descended upon the seats (see the Roman section in Fig. 1), after an excess of 35m., or, roughly, 114 ft. It is possible, however, that the considerable prolonging of tones and vowels which must have resulted from this was deliberate, and an effort to compensate for the deadness of open-air conditions. The need for a roof began to be felt.

The lesson of the classic theatre remains, however. It is this : that reflecting plus resonating surfaces *near the source of sound* will work wonders.

Churches.—The mediæval church was the antithesis, in acoustics, of the Greek theatre. The enclosing masonry walls and vault acted as bright mirrors to all sounds. The congregation occupied only a fraction of the enclosing surfaces. The priests, like the classic players, chanted or intoned their words, but for a very different reason. The inter-reflections from all surfaces caused what is known as *reverberation*. The term in Italian or French refers to *light* as well as to sound and means *dazzle*. It means a high energy condition for all sounds produced within the building. Whereas the Greek theatre was an instrument low and distinct, the mediæval church was loud and incoherent. It also reinforced certain tones rather than others for a reason I cannot enter into here. The result was that intoning was rendered inevitable by the duration of each syllable. Also the intoning on a *certain note*, or in a certain tonality, reinforced by the church, was likewise rendered necessary. These acoustic conditions produced their own characteristic results in choral music and in intoned liturgy. The speaking voice from the pulpit never was and never can be easy under such conditions. In music the elaborate polyphony of the Palestrina Mass, with its inweaving of melody, its crescendoes and diminuendoes, was possible. The staccato and other tempo effects of what is termed " classical " music are impossible where there is a reverberation of five or ten seconds. The Gothic revival restored to us the cruciform plan and lofty vault and abolished church galleries. But the sermon was not abolished at the same time, and, since the mediæval form became orthodox for all denominations, there has been considerable conflict between the pulpit requirements and the intoning conditions. In modern church design a compromise is necessary. It is possible to preach slowly with a reverberation of three seconds, yet this very slowness is often a matter of complaint by popular preachers. It is difficult to apostrophize or denounce clearly where there is a long reverberation.† On the other hand, the choral Eucharist sounds well. The compromise is best effected by placing the pulpit with a back wall behind it and a reflector above at an angle of 45 deg. and extending, if possible, some feet over the pulpit, and by treating walls and vault with an absorbent plaster.

The best Anglican auditory is the City Church.

* *Norfolk Archæology*, Vol. VII, 1872, p. 93.

† In the Middle Ages excommunications were pronounced from the pulpit, also homilies read and parish notices given out. Yet all these could be read slowly, not spoken. The sermon was neglected for various reasons for long periods. It is recorded that no sermon was preached at Rome by a bishop for five hundred years after the fifth century. (Palmer's *English Ritual*.)

Wren must have thought a great deal about acoustics. He gets to the heart of the matter when he says :

" The Churches therefore must be large ; but still, in our reformed Religion, it should seem vain to make a Parish-church larger, than that all who are present can both hear and see. The Romanists, indeed, may build larger Churches, it is enough if they hear the Murmur of the Mass, and see the Elevation of the Host, but ours are to be fitted for Auditories . . . to build more room than that every Person may conveniently hear and see, is to create Noise and Confusion."—(Letter on the City Churches.)

The lesson of the mediæval church is that a long reverberation is necessary for the finest choral (unaccompanied) music, but that requirements for choral music and for the speaking voice are *mutually conflicting*.

Special Church Forms.—In churches where the reading and speaking voice are emerging as the dominant factors it is wrong to preserve the mediæval form. The Christian Science church requires good audibility for the reading voice delivered from two parallel reading desks. Also an important requirement is good hearing from every seat in the body of the church for the speaking voice at the Testimony services. Good reflecting surfaces near the source of sound should be designed, the principles holding exactly as in the Greek theatre. For the speaking voice on the floor of the church a special reflector should be used in the shape of a flat ceiling normal to every seat and capable of reflecting sound from any one seat to all others. Unless reverberation is cut down the tendency for the reading voice will be to intone which is not desirable, and the tendency for the speaking voice to be hopelessly indistinct. Since the services rely upon these factors, and not in any sense upon a liturgy or choral music, ordinary parish church conditions are not suitable for a Christian Science church. The reverberation requires to be below two seconds. The ceiling should not be higher than 35 ft. above the heads of the congregation. The main reflectors should be hard, side walls and rear walls behind the audience should be rendered absorbing. The same conditions apply in the case of Friends' Meeting Houses and other places of worship where the speaking voice is the main factor and in which any seat in the congregation may become a source of sound.

Concert Rooms.—A reverberation of two or three seconds at least is necessary for full tone in choral music. Generally speaking, choral music sounds well in a church of moderate dimensions and sounds less well in a packed concert room. Orchestral music requires at least two seconds' reverberation, and a good concert room should provide at least this. A certain brightness of tone can be secured by other means, but that quality which is best described as "full" can *only*, in my opinion, be secured by reverberation. Now reverberation varies directly with volume—that is to say, the larger the room the longer the reverberation ; and inversely with the absorbing power of the room—that is to say, the greater the absorption the shorter the reverberation. The greatest absorbent in any auditory is the audience, and the absorption necessary to insure a two seconds reverberation is frequently provided for by the relatively large audience common to concert rooms and opera houses. Consider a concert room seating two thousand. A rough preliminary calculation will show that such an audience will provide $2{,}000 \times 4.7$ (Sabine's coefficient of absorption per person is 4.7) = 9,400 units of absorption. In order to secure a reverberation of two seconds this requires a minimum air volume of 376,000 cu. ft. But other factors, such as carpets and drapery, etc., will also contribute slightly to the total absorption. This means that for good musical effects the figure 376,000 cu. ft. is on the small side for an audience of 2,000.

Another point to consider in the design of concert rooms is the fact that a large air volume seems to demand a certain reverberation from the musical point of view, and where it is not forthcoming complaints come invariably from executants on the platform. A sense of deadness and absence of power is the symptom. Professor F. R. Watson* has tabulated the acoustic data of auditories which have been pronounced good by public opinion. The results for concert halls show that the time of a satisfactory reverberation increases with the size of the auditory. For instance :

New England Conservatory of Music. Volume 8,000 cu. ft. Reverberation ($\frac{1}{3}$ audience) $1\frac{1}{4}$ secs.

*Watson, F. R., *Acoustics of Buildings*, 1923, p. 30.

Kilburn Hall, N.Y. Volume 101,000 cu. ft. Reverberation ($\frac{1}{3}$ audience) $2\frac{1}{4}$ secs.

Leipzig Gewandhaus. Volume 407,000 cu. ft. Reverberation ($\frac{1}{3}$ audience) $2\frac{3}{4}$ secs.

New Concert Room, Boston. Volume 634,000 cu. ft. Reverberation ($\frac{1}{3}$ audience) 3 secs.

This means that in designing a concert room it is necessary to get a right relationship between air volume and reverberation if the concert room is to be an instrument to the sound as well as an auditory. This is important to bear in mind in practical cases where the cube has to be cut down owing to price. Where choral music is a prime requirement an air volume corresponding to Professor Watson's table should be insisted upon. Where, however, the room has to be used not only as a concert room but as a large assembly room for the speaking voice the problem can be tackled in a different way. The volume can be reduced, but to compensate for the lack of tone wood resonating surfaces must be introduced near the source of sound. If it is found that the reverberation is considerably less than two seconds, dissatisfaction both in regard to tone and loudness of instrument and of voice is sure to be felt unless a policy of resonance is carried out. The typical example is Covent Garden Theatre, where the speaking voice is distinct owing to a reverberation which is short in comparison to the volume, but where the tone of musical instruments is bright. There is a great deal of wood panelling in Covent Garden (the effect of wood panelling on instruments is roughly to absorb sound in the lower rather than in the upper register and thereby to increase the relative power of over-tones). The lesson of the Greek stage floor and of the pinakes should be applied. The floor of a platform or orchestra pit having a six-inch air space below it will reinforce the notes of average pitch for instruments in contact with the floor. The six-inch air space can be provided by wooden floor joists six inches deep resting upon concrete. The joists should run towards the proscenium and the air spaces between should communicate with the air in the auditory by means of suitable openings. The point of a six-inch air space rather than a larger one is that this depth will give a more even reinforcement over the whole scale.

Since the audience supplies 90 per cent. of the absorption it is obvious that the musical effect will be different at rehearsals to the final performance. This is a serious problem and frequently complained about by conductors. The remedy is a thick curtain to be lowered behind the conductor, closing in the orchestra platform and shutting out the auditory. At Amsterdam, in the Concert Gebouw, a thick curtain descends from the ceiling and drops to the front edge of the platform. A curtain of this kind should be provided in the original design of a concert room. It should be made to slide back and be completely screened when a full audience is present, or intermediately to draw out or back according to the number of the audience. Adjustable absorbing material arranged in this way is also desirable for chamber music where instruments as different in tone as the flute and the bass voice are to be heard. The quality of instruments can be considerably amplified by the absorbing or non-absorbing of over-tones by means of thick absorbents.

In plan I recommend, without any hesitation, for large concert rooms the fan shape, with a part of the splay to right and left of platform turned over to form a deep proscenium arch. In this way useful reflectors are formed near the source of sound. An added advantage of the fan-shaped plan in the case of the concert room is that the width of the orchestra space is restricted and too great a discrepancy between the arrival of sounds from different instruments is avoided. Yet even with the fan shape the best seats for musically minded people will be not the front but some thirty or forty feet away, where there will be a proper assembling of sounds upon the ear. Frequently the worst seats in the house are those upon the extreme left or right of the front rows, where the whole effect is astigmatic. A small concentrated orchestra will give a finer musical effect than a large dispersed one, yet the tendency of the time is towards large orchestras and large choirs. The seating for the choir at the Queen's Hall is too small. Provision should be made nowadays for a choir of five hundred and an orchestra of one hundred.

The position of the organ is controversial. If placed at the back of a deep platform recess it is liable to confuse the choir and to be inaudible in a crowded concert room. Organ builders are able to cram an organ into any small area, and will do so if they are ordered by the architect; but the practice is a bad one. My opinion is that the

keyboard should be a movable player upon the orchestra stage or located near the conductor. The late Mr. H. H. Statham, in his excellent article called " Building for Music " (*Architects' Journal*, 10 August 1910), says : " Having kept the summit of the chorus seats as low as can be, all the mechanism of the organ bellows, wind-chest, etc., should be sunk behind the chorus. The sound board upon which the feet of the pipes rest should not be higher than the top level of the chorus seats, and may be some distance below it to allow for their height. They will be heard just as well." If there is no keyboard recess this means that the sixteen feet of height necessary for the pipes can leave an air space above for the sound to get out. The rear wall of the organ chamber can be tilted forward and plastered with sirapite or Keen's, and if the ceiling of the whole platform recess is splayed and similarly plastered the whole recess will then act as a powerful source of sound.

Having provided a large area of resonant wood surface, and having directed the bulk of the sound out upon the audience, it remains to prevent reflection back from rear walls behind the audience. This can be done by a frieze of acoustic felt or of slag wool, in either case screened by canvas.

The English Legislative Chamber.—In England we have developed a type of auditory as characteristic in its way as either the Greek theatre or the mediæval church, namely, the national committee room or " House of Commons." Like the other two main types it has in course of time produced its own style of utterance, and it illustrates better than the others one important aspect of acoustic design. I shall lay before you briefly the stages of development of the type of auditory which contributed definitely to Burke's speeches on American affairs and to the oratorical styles of Macaulay, Gladstone and Asquith.

Its basic principle is debate ; and debate has requirements very different to the requirements of stage plays or intoned liturgy. The finest and most characteristic English oratory I take to be those passages where a Member of Parliament is in the middle of a dialectical combat, the method of which is strictly defined by tradition, and in which he picks his way through a close argument as with drawn sword and the sharp eyes of enemies upon him. The performance is one of reason informed by passion, but we are listening first to an argument of facts and figures and an argument which must be clearly *heard*, for it may be a matter of life or death to a Government to answer it immediately. This quality of rapid debate distinguishes English oratory from the Continental.

Now the nature of this kind of oratory is bound up with the building in which it took place. It was necessarily a small building. Burke spoke in St. Stephen's Chapel, which was, as fitted up for the House of Commons, some 60 by 32 feet, or less, in area, and only 26 feet 6 inches high. Also he spoke from where he stood when he had jumped to his feet. He had not made a formal journey to a tribune centrally placed. But he had half his audience behind his back. In this tiny chamber —a college chapel in character—our liberties were forged by the implement of speech.

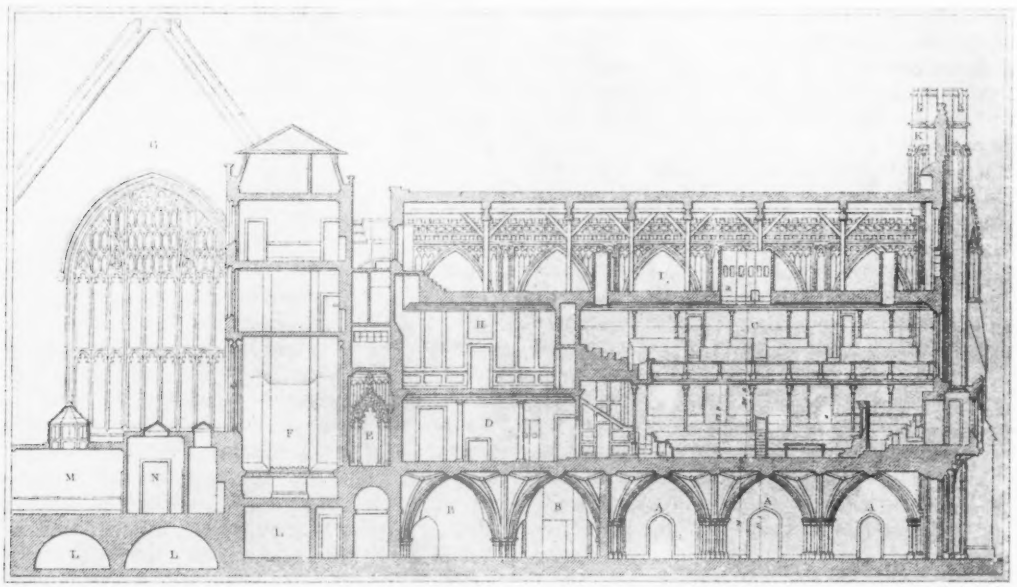
The St. Stephen's Chamber admitted an extra 45 members from Scotland after the Act of Union of 1705, but apparently it was not until the year 1800, when a hundred Irish members had to be accommodated, that plans for a new chamber were called for by a Select Committee in 1831. Soane, Savage, Decimus Burton, Blore and others submitted schemes. But after the fire of 1834 all these schemes were forgotten. The old Painted Chamber was fitted up for the Lords and the old Court of Requests, previously occupied by the Lords, was prepared for the Commons. Both these buildings were gutted by the fire, and the first temporary fitting seems to have been carried out by Sir Robert Smirke. Now this Chamber in the old Court of Requests was larger than the Chamber in the St. Stephen's Chapel. It was 80 feet by 38 feet, and in the engraved view given by Brayley and Britton in 1836* it looks some 40 feet in height. This would have meant a longer reverberation, and acoustic complaints must have occurred, for alterations were undertaken. The view of the interior of the House of Commons, published in 1841 in a volume called *London Interiors*, shows what appears to be the same room lined with wood and with a low ceiling of a special shape. This is known as " the temporary House," and became famous for its good acoustic qualities. The lowness of the ceiling was apparently due to the ideas of Dr. Reid, the ventilation expert, in whose opinion " the cubic content to be filled by the voice should be as small as was consistent with the necessary accommodation. For

* Brayley and Britton, *The Palace of Westminster*.

that reason he had the ceiling of the temporary House made very low so that there should be not much space to be filled." (Evidence before the Select Committee, 1868.)

Since St. Stephen's Chapel had a chamber beneath it it was apparently necessary also that all succeeding Houses should have the same. The chamber beneath the temporary House was made to communicate with the Chamber above by means of holes drilled in the wooden floor. This arrangement was used by Dr. Reid for ventilating. The accustomed to the lowness of the temporary House immediately concluded that it was the height of the present building which was at fault. It was imperatively ordered that the ceiling should be lowered, and the only way in which this could be done was by the introduction of an inner ceiling with sloping sides cutting the side windows in half and ruining the proportion of the room."

The conclusions of members, however, were quite right. What was at stake was that facility for rapid



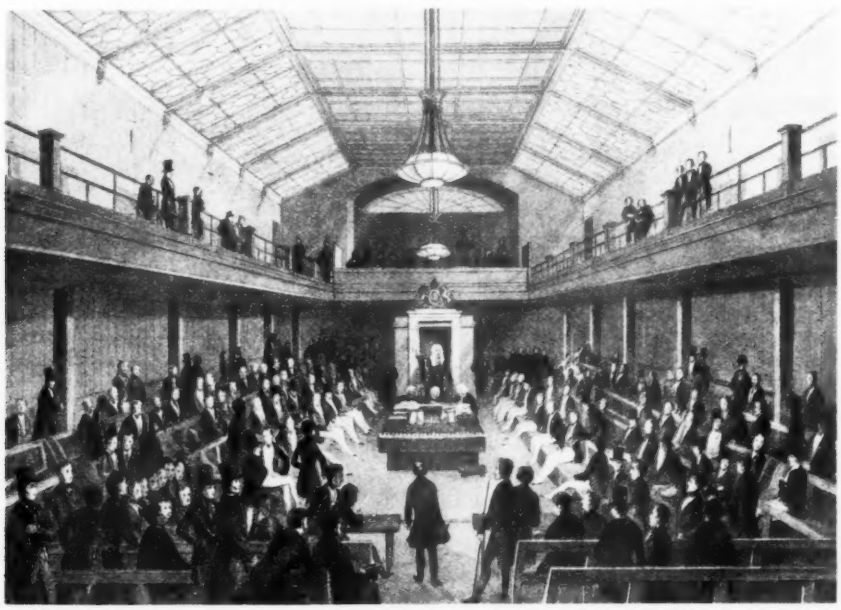
R. W. Billings del. *G. Gladwin fec.*

SECTION OF ST. STEPHEN'S CHAPEL AND CRYPT
As fitted up for the House of Commons, 1834

fame of the House for good acoustics reached Jenny Lind, who on a visit to England insisted on visiting it and singing a song within it.

In this view we first see the ceiling which might be described as the House of Commons type. It occurs in three designs for the chamber. The acoustic excellence of this room, *thus transformed* (long remembered by members), undoubtedly caused the adverse criticism that immediately occurred when the Parliament assembled in 1848 in Sir Charles Barry's new House. Sir Charles Barry's biographer says : " It was conceived that there was difficulty in hearing, and members debate which cannot exist with a long reverberation. Now reverberation (other factors being equal) varies directly with volume, and volume with height of ceiling. In 1850 a new ceiling, similar in shape to Smirke's (though the effect of the shape was probably not understood), was inserted, and the result was a great improvement. Barry's House of Lords maintains its original ceiling. Tradition says that the House of Commons, before the new ceiling was inserted, was worse than the House of Lords. After the alteration to the Commons all were agreed, and are still agreed, that the Commons is good, whereas the Lords is bad.

Sir Henry Lucy,* describing the House of Lords, says : " Of the coroneted host there are not more than twenty who can make themselves distinctly heard even within the limits of the red leather benches. In the Press Gallery debate may be reported by a system of collaboration. Groups of reporters writing out their notes sit together, each contributing his quota of fragments reaching his ear." It is interesting to note that Queen Victoria could always adapt her voice to suit this chamber and that the speech from the throne was audible in every part of the House. But the speech from the throne is read and not spoken.



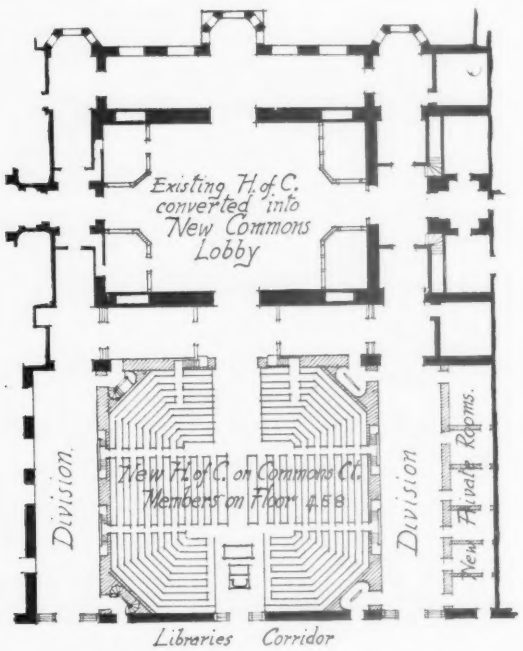
T. H. Shepherd *H. Melville*

TEMPORARY HOUSE OF COMMONS, 1840

In the Commons the old habit of rapid debate at conversational pitch was rendered easy by the new ceiling. Complaints, however, arose and still arise from members in the back benches for the following reasons. The English legislative chamber is not only an auditory, but also a machine of business. Its excellence in this respect was found on analysis (Select Committee House of Commons Arrangements, 1868) to consist in the fact that Ministers in charge of Bills are near the Speaker (or the Chairman of Committee), and near the Press Gallery. A great deal of the business of the House is done in a voice of conversational pitch across the table, and Ministers addressing the Chair can be well heard by the Press gallery immediately above the Chair. The importance of the Press is obvious. Nowadays it really represents the largest part of the audience, namely, the general public, and its acoustic requirements should be placed second after members. But in addressing the Chair from front benches, a speaker has a large part of his audience behind his back. In the English system the speaker is the only permanent audience, and any member's seat may become a source of sound—unlike the Continental system, where every speaker must come to a tribune. Hence the periodical demands in modern history to have the table, and the Ministers with it, moved down the floor to a more central position. By this means also the Treasury and Front Opposition benches could be increased from the now inadequate sixteen seats to twenty-two or twenty-four. The effect of the splayed ceiling is to con-

* *Lords and Commons*, 1921, p. 64.

centrate sound on front benches, and since the important business of the House is carried on there, this is an advantage; but it does not help members in the back benches. The reflected beams of sound from the splayed portions of the ceiling are shown in Fig. 2 concentrating on the front benches and missing the back seats and the galleries. The beam from the centre level portion covers only the seats *in front* of a speaker. Seats behind front bench speakers are, therefore, ill provided. This ceiling



E. M. Barry's Plan for a New House

is constructed of wood and of glass, and is, therefore, not as efficient a reflector as if it were of hard plaster. If this were the case, and if the slopes of the ceiling were adjusted, the room could be made nearly perfect. The total volume of the room is only 127,000 cubic ft., which is very considerably less than the French Chamber of Deputies, 277,000 cubic ft., the Washington House of Representatives, 409,000 cubic feet, or the London County Hall, 237,000 cubic feet. The advantage of restricting the volume had already been impressed upon a previous generation by Dr. Reid, and it is referred to as an important point in the evidence before the Select Committee of 1868. The blue book containing the evidence and report of this Committee is an important

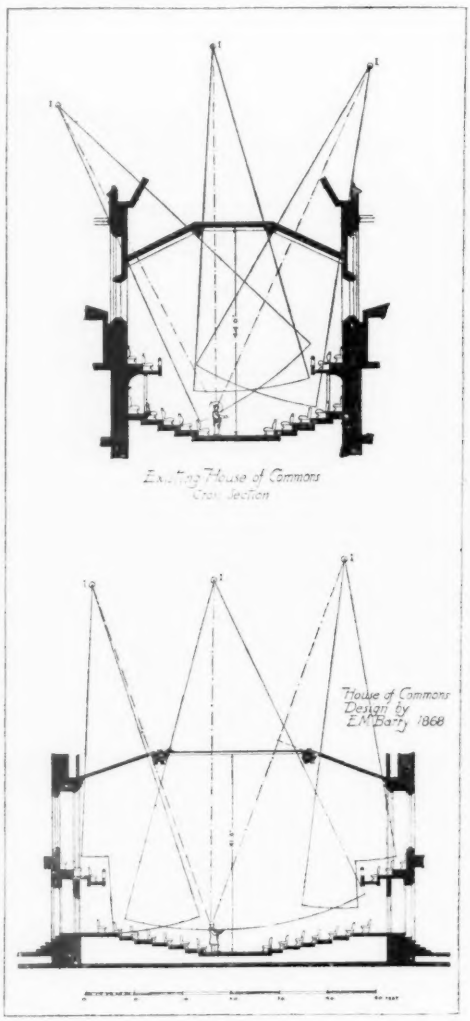


Fig. 2

original document on acoustics. Professor Tyndall gave evidence and specially emphasised the value of a low ceiling. He says: "In order for the echo to be of any possible advantage, it must follow so hotly upon the direct utterance that

one shall be practically superimposed upon the other. Otherwise . . . the echo is so related to the sound itself as to destroy the definition of its boundaries. I admit that you get more noise, but you get less distinctness and definition, and definition, I think, is one of the most important points in speaking." Professor Tyndall added: "I cannot help thinking that draperies have a very great influence in quenching the reflected sound, and thus destroying the after sound." In these paragraphs, reported in 1868, the Sabine theory of reverberation is obviously foreshadowed. The upholstery in the House of Commons, of course, contributes much by absorption to the shortness of reverberation. There was considerable discussion before the Select Committee (1868) as to whether the air volume of the ventilating chamber under the floor should be taken as part of the air volume of the House. With our modern knowledge, it is obvious that the perforated floor, covered as it is at present with carpet, acts simply as a very powerful absorbent. Another factor, probably active, is resonance from the wood panelling. Thus by thorough British methods of trial and error a very interesting and effective acoustic instrument has been evolved.

THE HOUSE OF LORDS

E. M. Barry, son of Sir Charles, designed a new House of Commons at the request of the Select Committee of 1868. The evidence of that Committee was not lost upon him. He preserved the shape of the ceiling and actually lowered its height. The action of the splay in E. M. Barry's design is more valuable than in the existing House. It provides useful beams of sound from front benches to seats in their rear (see Fig. 2). If at any time the House of Commons is to be re-built, this excellent design should be carefully studied.

The lesson of the House of Commons is that a right acoustic tradition for buildings of this kind exists in England and should be followed. It is a useful tradition, both for hearing well and for doing business. It is the opposite of the "Church" tradition, previously discussed, on which our Law Courts and many of our places of business were designed.

Behaviour of Ceilings.—In Fig. 3 seven common types of ceiling are shown in cross-section, including the House of Commons type. (The rooms are 60 ft. wide and the maximum ceiling height 40 ft. above the speaker's head.) The reflections from each are plotted for various positions of a speaker S, showing the amount of useful sound distributed by each upon the floor. Where there are curves their centres are shown marked C, and the position of these centres plays an important part in the efficiency of the ceiling. The positions of listeners at floor and gallery levels are also shown. Fig. 3 (1) is the flat ceiling showing an equal distribution of sound over the floor no matter what the position of the speaker. Fig. 3 (2) is a barrel vault with centre C some ten feet above the speaker's head. The crown of the barrel transmits sound usefully upon the floor after it has passed through a focal area. The effective ceiling area is represented by the arc D E which causes the

wave front G K. Sounds striking the lower portions of the barrel transmit wave fronts represented by the arc K M which strike the side walls and vault opposite and are in their turn reflected back as the wave front N O. This means that barrel vaults cause inter-reflections and therefore make for reverberation, while only the crown reflects usefully upon the floor. Barrel vaults therefore are often useful where choral music and a long reverberation are required. They are invariably bad for the speaking voice.

In Fig. 3 (3) a segmental ceiling is shown with the centre of the curve at the level of the speaker.

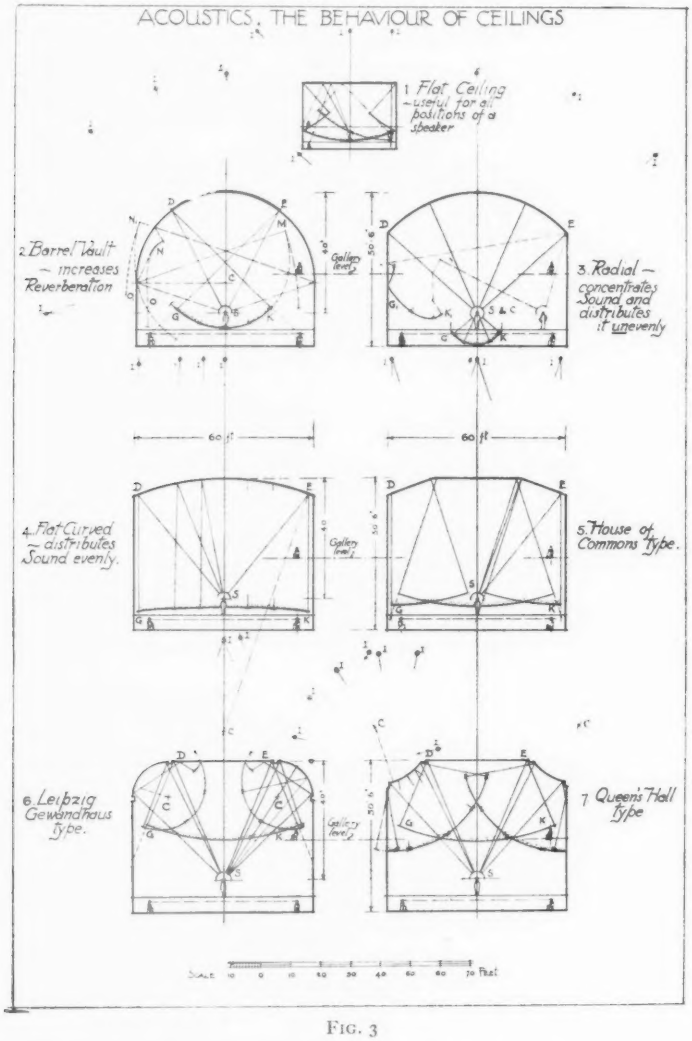

ACOUSTICS. THE BEHAVIOUR OF CEILINGS
1. Flat Ceiling – useful for all positions of a speaker
2. Barrel Vault – increases Reverberation
3. Radial – concentrates Sound and distributes it unevenly
4. Flat Curved – distributes Sound evenly.
5. House of Commons Type.
6. Leipzig Gewandhaus Type.
7. Queen's Hall Type
Gallery level
60 ft
S & C
Scale 10 0 10 20 30 40 50 60 70 Feet

FIG. 3

S and C take up the same position. This form concentrates sound along the centre of the hall and is bad for any purpose whatever. If the speaker moves to S, the beam is concentrated opposite him as shown. The gallery level gets

no sound. At least four cases I have recently had owe their trouble, or the aggravation of their trouble, to a ceiling of this kind. A ceiling should distribute sound evenly over the greatest area of seats,and if it concentrates sound in certain localities it will necessarily weaken it in others. In this case—Fig. 3 (3)—the great arc of the ceiling D E concentrates sound on the little arc G K. Therefore the sound is intense in the centre of the hall and along a corresponding line on plan.

In Fig. 3 (4) a segmental ceiling having a centre C 33 ft. below floor level is shown. Here the curve of the ceiling sends down a beam of sound evenly distributed over the whole cross-section. This form is safe and useful for all purposes where a platform position is used. The radius of the curve should not be less in relation to the height of the room than is shown here. The flatter the curve the more even the distribution.

Fig. 3 (5) is the House of Commons ceiling slightly adjusted. It has the advantages of the flat curve 3 (4). But both these types have this disadvantage: that if a speaker moves near the wall the beam is given a direction towards the opposite side and does not cover seats on the near side.

Fig. 3 (6) and Fig. 3 (7) show a flat ceiling having respectively concave and convex coves, as in the case of the Leipzig Gewandhaus and the Queen's Hall. Both are useful when a platform position is used, and the extremities of the ceiling are therefore useless for reflecting. In the case of a concave cove the sound touching it, after passing through a focus, is widely diffused and thus rendered harmless; in the case of the convex cove it is directly diffused and by the shape of the curve can be given either a very wide diffusion or, as in this case, a diffusion just sufficient to be of use to the galleries.

Modern Parliament Chambers.—In the designing of modern parliament chambers, the problem is to provide a plan semi-circular or semi-octagonal in shape to meet modern states of opinion, and yet still able to dispense with a tribune position for the speaker. The advantage of a tribune is twofold: Firstly, a speaker has all his audience in front of him, and, therefore, useful reflecting surfaces can be designed to his right and left; and secondly, a single direction is given to his voice to which he becomes accustomed. The large Continental Parliament houses, all of great height, are indeed acoustically workable mainly because a central tribune position is used. Since without a tribune front bench speakers have a large number of listeners at their back, the ceiling should always be used as a reflector normal to every seat in the house, Fig. 4—that is to say, flat, and not more than 35 ft. in height. A semi-circular or semi-octagonal plan can be made to supply also reflecting surfaces along the diameter behind the chairman.

The requirements of the Press should also receive special attention, and the smooth working of the Press in connection with the House of Commons should be borne in mind. It is not sufficient nowadays to allot one of the distant galleries to reporters. Since every member's seat in a British assembly can become a source of sound, and since reporters cannot move about to advantageous positions, they should be located on the floor of the House in a mean position for good hearing and with a door of their own giving access to the lobbies. A reporter who wants to ask a question of the member after a speech should be able to dissociate himself rapidly from the writing tables without making too great a noise or disturbing his colleagues. Public galleries should form part of the main cell of the chamber as in the House of Commons and should not be placed in a deep recess. Where recesses are used they should be wide and shallow and without a screen of columns.

Above all, it is necessary to design for the reverberation. As a rule in a legislative chamber the number of persons present is always relatively small in proportion to the air volume of the building. A large council chamber, for instance, may have a frequent attendance of a hundred persons only, whereas a theatre of the same volume would seat a thousand nightly, or ten times. This means that large areas of permanent absorbing material must be provided in suitable positions in order to compensate for the lack of audience and reduce the reverberation to a figure suitable to the speaking voice.

What are the sound-absorbing materials suitable for modern buildings and likely to be approved by architects?

Absorbing Materials.—We have seen that there exists a valuable British tradition in one class of auditory, namely, that for debate. But the

important evidence placed before the 1868 Commission remained undeveloped except for E. M. Barry's design for a new chamber. Until the recent experiments carried out under the B.R.B. of the Department of Scientific and Industrial Research the American coefficients of absorption were all that the architect had to go upon if he should desire to embody the House of Commons

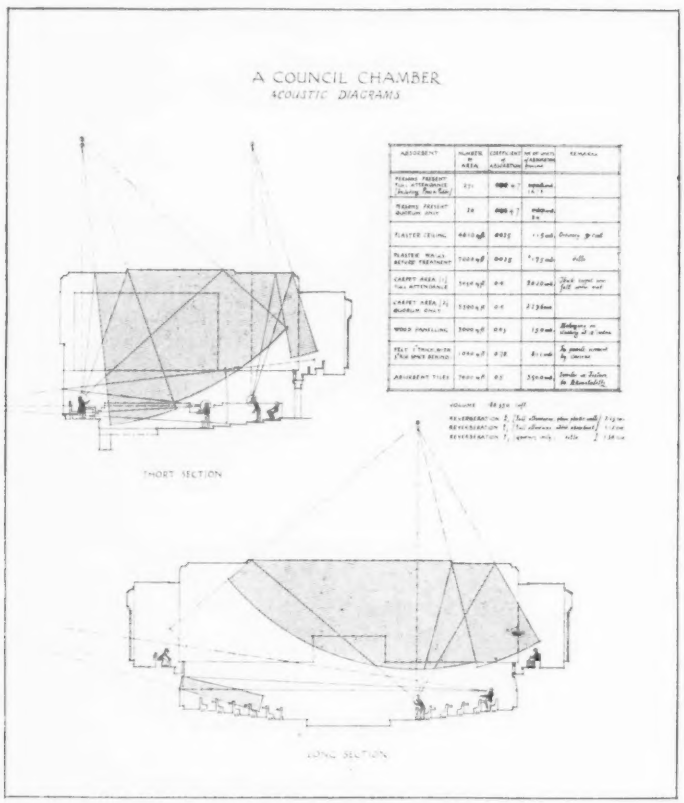


FIG. 4

tradition in a building and to do his work with some precision.

The requirements for a good absorbing material are: 1. Cleanliness. 2. Durability.—The absorbents available for architects at present fall into two classes. First the soft materials requiring a canvas screen, and secondly the plasters and tiles. Although I yield to none in my admiration of the American results, it must be clear to architects that direct experiment upon English materials and fittings is most important. American methods are not the same as ours, and all kinds of factors connected with building practice enter into the problem. The results of the Building Research Board experiments upon British materials *fixed exactly as an architect would have them fixed*, have already been most valuable. These experiments were undertaken at the request of the Indian Government, on the suggestion of Mr. Herbert Baker, on account of the work at Delhi. The experiments were carried out by Mr. P. W. Barnett, A.R.I.B.A., assisted by Mr. W. H. Glanville, B.Sc., and other members of the staff of the Building Research Station, under the direction at first of Mr. H. O. Weller, M.I.C.E., Hon. A.R.I.B.A. (late Director of Building Research), and now of

Dr. R. E. Stradling, M.C., Ph.D., the new Director. A room was found and treated in order that it might give in its initial state a very long reverberation. Into this room the materials to be tested were brought and their effect on the reverberation was noted. The first result was that an architect could enter the test chamber and hear for himself the result on the energy condition of the room of introducing the material suggested. The experiments were necessarily empirical, since a comprehensive investigation was not possible in the time available, but very great care was taken in calibrating the room and in taking readings. The tests were made to cover the musical scale at octave intervals. Some of the many results obtained can be stated briefly as follows :—

The most powerful absorbent of all (for pitch C_4) which an architect can use is slag wool behind wire netting. The efficiency of this absorbent declines rapidly above C_5—that is for higher notes.

The next most efficient absorbent for C_4 is Cabot quilt. This material is easy to apply and is hygienic and not harmful to the touch like slag wool. It is slightly resonant. (The brown paper envelope and the enclosed volume of air probably cause this resonance.) It improves the speaking voice conditions, but will not give the best results for chamber music owing to unequal reinforcing of tones. It was fixed in two layers on 2 in. by $1\frac{1}{2}$ in. battens, 2 ft. 8 in apart, and had thus a $1\frac{1}{2}$ in. air space behind it.

The next most efficient absorbent is 1 in. hair felt. Felt is a material used very widely in America and was found at Harlesden to make, in conjunction with wood, the best conditions for chamber music. But if felt is to be widely used in England it must be made really moth-proof and fire-proof. The felt was also fixed on 2 in. by $1\frac{1}{2}$ in. battens.

All these three materials require canvas screening. Of the wall panellings cork 1 in. thick framed in wood with an air space behind gives fairly high absorption for C_4.

Celotex board was found to be an efficient absorbent and to give excellent results for chamber music.

Of the permanent flooring materials rubber carpet $\frac{3}{16}$ in. thick was found to be the most efficient.

Owing to the courtesy of Professor Paul Sabine of the Geneva Laboratory, Illinois, experiments were undertaken upon an acoustic plaster using his recipe as a basis. These experiments produced interesting and useful results and are still in progress. An acoustic plaster was developed causing for C_4 at least 20 per cent. reduction in the reverberation of the room. (This figure must not be taken to represent a Sabine coefficient.) A surprising result of the experiments in this class was the efficiency of coke breeze blocks 2 in. thick. It is shown by the experiments that coke breeze slabs having a finishing coat of acoustic plaster would make a very efficient absorber. In designing a building like a modern church or council chamber, where the audience factor is small compared to the volume, and where a short reverberation is essential, it may be necessary to cover all the wall area above a certain level with an absorbent plaster. In such a case an absorbent of this kind would be most useful.

In addition to the experiments by the B.R.B. some interesting experiments have been carried out by Major Tucker of the Signals Experimental Establishment, Woolwich, upon various samples of acoustic plaster supplied by the Building Research Station. Experiments on Sound Transmission and on analysing by means of the ripple tank are also in progress at the National Physical Laboratory. The physicists are now interested in our problems, and it is for the architects to place their conundrums before them. Formative research will come in response only to a real demand formulated by architects. We spend our lives in experiencing the shapes and materials of buildings, and we are the first to hear acoustic complaints. If we listen in buildings as well as look at them we can make valuable acoustic observations, we can keep records of results, and if we are in touch with the physicists we can suggest the lines of research by which we ourselves are to be the first to benefit.

The Discussion on Mr. Bagenal's Paper will be published in the next issue of the Journal.

The Mosque "El Aksa," Jerusalem

BY WILLIAM HARVEY.

The Institute Library has received from Colonel Ronald Storrs, the Governor of Jerusalem, three drawings of the domed portion of the mosque El Aksa, Jerusalem, made by Prof. A. Kemaledin and his staff preparatory to the repair of the structure.

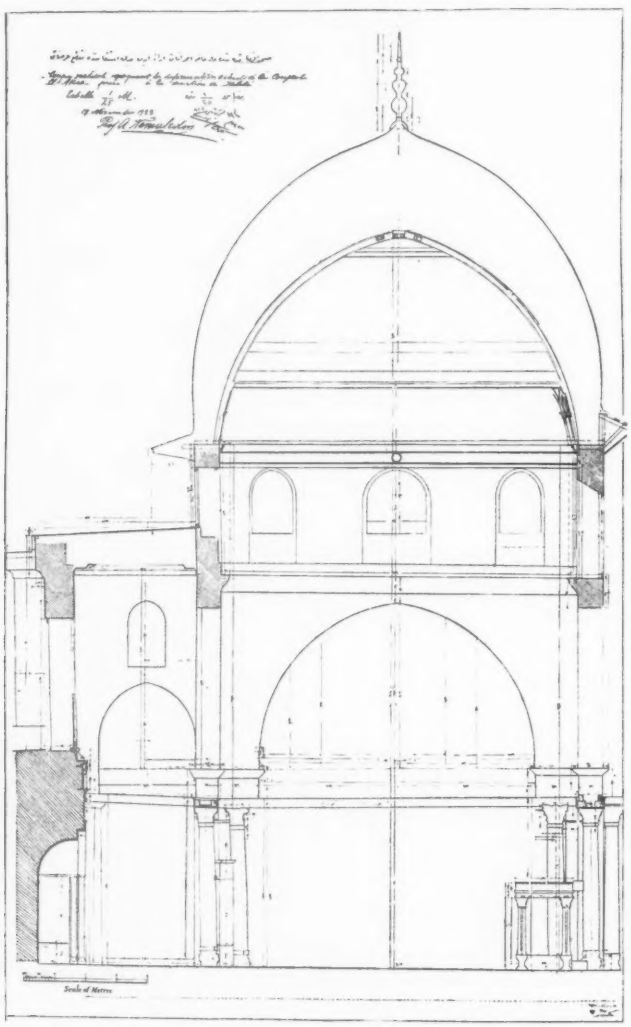


FIG. 1. AKSA MOSQUE, JERUSALEM. Part of Longitudinal Section through Kibla, looking west.

The works of conservation are being undertaken by the Supreme Moslem Council of Palestine under the advice of their consulting architect, Mr. Ernest Richmond [*F.*], whose book on the decoration and inscriptions of the buildings in the Haram-ash-Sharif will be published this autumn. The proposed works will include treatment of the timbers of the domes against the attacks of anobiid beetles and necessary structural repairs.

Professor A. Kemaledin is well known as the Chief Architect to the Ministry of Awkaf at Constantinople, and now that he has been appointed Chief Architect to the Supreme Moslem Council of Palestine, with

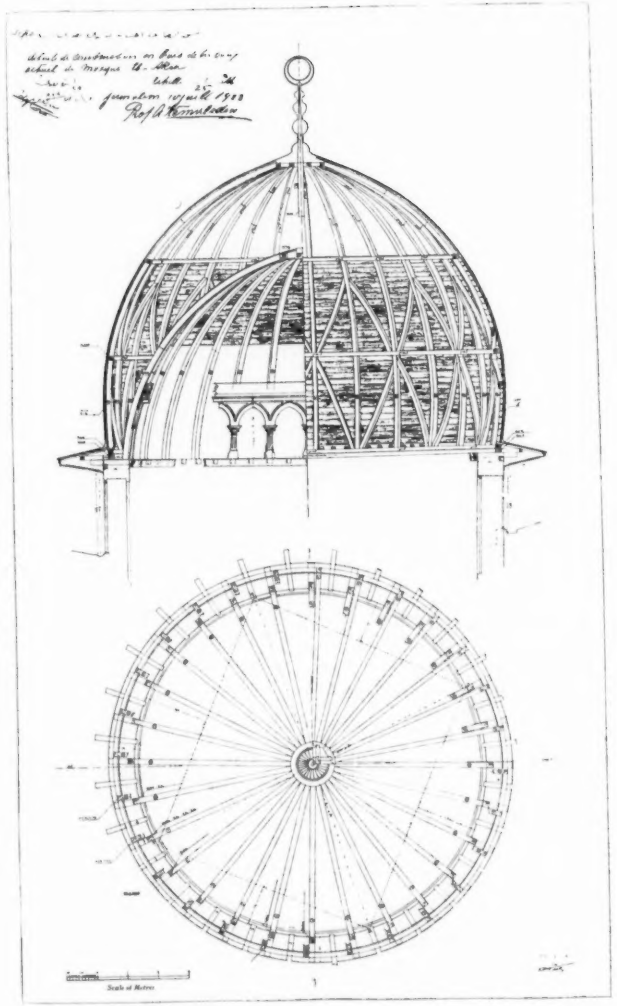


FIG. 2. AKSA MOSQUE, JERUSALEM
Detail of Construction of Timber Domes

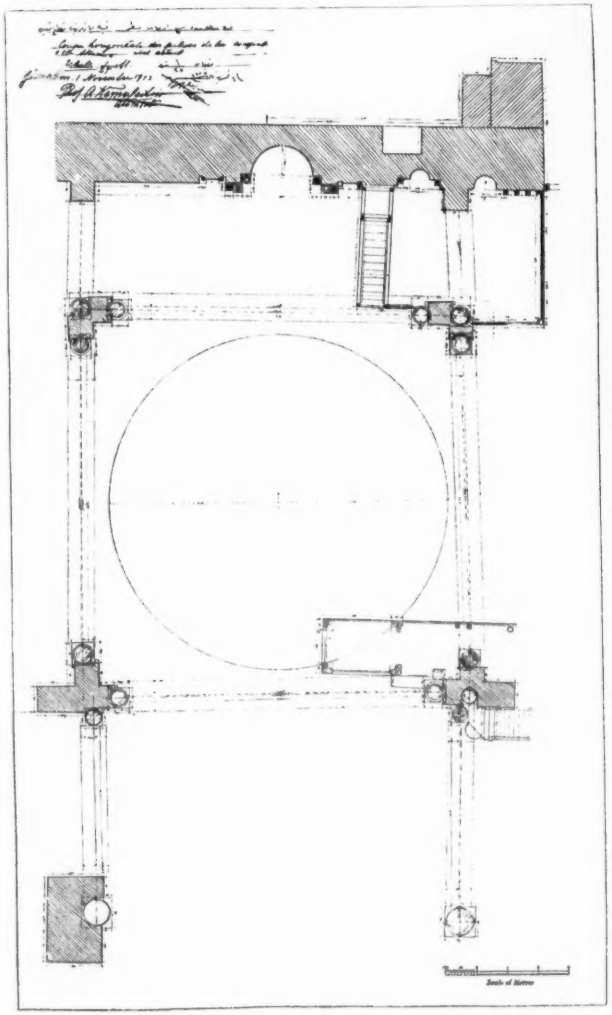


FIG. 3. AKSA MOSQUE, JERUSALEM
Plan of Domed Portion and Kibla

control over the Dome of the Rock and the Aksa mosque, these exquisite buildings are at last safe in competent hands.

Some years ago the necessary repairs were executed in the most haphazard fashion. In 1909, when I was studying colour decoration in the Haram-ash-Sharif, the roofs were visited at intervals by a plumber who worked single-handed, suspending himself on a plank slung on a rope tied around the stem of the gilded crescent finials of the domes. The man was reputed to be insane—poor plumber !—and exempt, therefore, from the objection taken to men in full possession of their senses climbing to high points overlooking the private houses and flat roofs of a Moslem city. It was only with the greatest difficulty that I—not being similarly qualified—obtained permission to ascend with him to his aery station.

The domes of both the Aksa mosque and the Dome of the Rock are formed in two separate shells of curved timbers. The outer shell is covered in each case with sheets of lead and the inner one decorated internally with modelled painted and gilded plaster (not mosaic, as was stated in a recently published work on Muhammadan Architecture). The use of two absolutely independent shells one surrounding the other without any cross-bracing or propping apart is characteristic of the trust in surface continuity of structure that differentiates Saracenic architecture from the articulated rib and panel method of construction adopted in Europe. The separation of the outer and inner domes is also a wise provision to protect the delicate decoration of the interior from vibrations received by the outer domes, which are exposed to severe storms of wind and hail on one of the highest parts of the Judean Plateau, 2,440 ft. above the Mediterranean (Figs. 1 and 2).

Another expression of the value of connectedness in architecture is to be seen in the system of anchor beams crossing the spans of the four arches bearing the pendentives and drum of the Aksa dome. Anchor beams had been used in Byzantine works, but the extreme lightness of support permitted at the Aksa mosque by the consistent exploitation of this method of restraining arch thrusts is probably unrivalled in works of the period (Fig. 3). The original building may even have had still more attenuated supports than are seen at present, for the masonry piers introduced between the marble monolith columns are probably afterthoughts inserted to strengthen the building after one of the historical earthquakes to which it is known to have been subjected. The exact date of the construction is still the subject of discussion.

Founded by Abd-al-Malik on the ruins of Justinian's church of St. Mary, it probably contains material from this building, but reconstruction by Saladin in 1187 probably accounts for the principal features of the design.

The proportions of the domed portion shown in the drawings seem to have been based upon multiples and simple fractions of the column heights. The chief intercolumniation, or rather the spacing of columns centre to centre, is practically twice their average height, and this abnormal width of span emphasises the great value of anchorages in maintaining equilibrium. The direct tie of the anchor-beam receives some assistance from the corbelling out of the springing of the arches and the consequent reduction of the span by the quarter of a column length. The drawings are figured in metres in Arabic numerals, the arch span shown on section reading 8·87 metres and the clear space between column bases 9·53 metres. The height of column from ground to top of capital is 5·14 metres.

The drawings are probably among the first accurately dimensioned records of the building to reach this country, though Mr. Ernest Richmond brought home some careful plans and sections of it in 1919.

Similar methods of dome construction in the Dome of the Rock appear in my measured drawing of that building made in 1909 and published in the R.I.B.A. JOURNAL of 17 June 1921.

Anchorages across the spans of the arches and the use of antique marble shafts as supports are features of both these neighbouring buildings; but whereas the arches of the Dome of the Rock are of point-rounded type, the pointed arch is used in the Aksa Mosque.

Mediterranean Civilisation*

BY C. R. ASHBEE, M.A. [*F.*].

Mr. Luke's *Anatolica* is a book that all who have been out East, or who love architecture, should read. It whets the humanist in one. It makes one long for more, whether it be architecture, poetry, love of landscape and the sea, or whatever else connotes civilisation ; his illustrations are delightful, and his map, by that clever artist Joan Kingsford, a joy. The book, which begins with a charming apologue concerning a shrewd old Moselm calligraphist, is divided into four main sections dealing respectively with Greece and Thrace, Cyprus, Syria and Jerusalem, and last Transcaucasia. Each of the four is a brief study of his subject—Anatolica. And how may we render the word. It is deceptive. Things about Anatolia ? No ; rather is it a series of essays on Mediterranean civilisation as we are gradually getting to understand it. Crete, Egypt, Athens, Alexandria, Rome, Byzantium, Venice, in the inner circle ; Spain, France, England, in the outer circle, have all contributed or been a part of it. Mr. Luke touches everything with a nice erudition, an appreciation for folk lore, a singular sympathy for all religious forms, and, above all, the personal experience of an administrator. Those who, like myself, have had the privilege of working with him know how valuable is this mastery of detail. In all that has to do with the Greek Church, indeed, he may be said to be a specialist ; and the Greek Church means a great deal more than its architecture or its religious observances.

As a result of the War we English appear to be engaged now in repeating the hopeless effort of the ages to determine the boundaries of western civilisation, boundaries that pass from north to south, somewhere east of Anatolia in a vague and wavy line, somewhere from the north of Georgia to somewhere in the south of Ma'an. All to the immediate west of thelinet hat bounds this wonderland is Mr. Luke's special province. There are few men, probably no English administrators, who know so much about it as he, or how the line, if it be possible to draw it, might be drawn, or what are the ways and customs, the religions and languages of the people that dwell about it. One rubs one's eyes and asks, " Is that why a far-seeing administration, ever mindful to put the right man in the right place, has sent him to Sierra Leone ? " But I forget myself. This is not a political but a technical publication.

So I would draw special attention to Mr. Luke's description of early Christian architecture, how that architecture is interlocked with Oriental forms, and what in architectural history they stand for as an expression of civilisation. Also I would point to his sympathetic descriptions of Moslem work, though I think he might have made some reference to the bibliography of Mr. Creswell and his now conclusive datings, with which he is, of course, familiar. His accounts of Turkish work, and what is left of it, especially in the Old Seraglio in Constantinople, are most timely. We have all too little idea of what we are losing, and how beautiful, particularly in woodwork, colour, calligraphy, and faience, much of it is. We owe a great deal more to the Turks than we have of recent years given them credit for. Whether from indifference or from good taste, they were preservers rather than destroyers ; and I once heard William Morris say, in quiet protest against the hysterical " bag and baggage " preaching of Gladstone, that had it not been for the Turk the world would have lost Saint Sophia in Constantinople. The Turk, at least, had a sense of reverence and tolerance, an æsthetic sense ; and all he did was to hang over its mosaics a few painted *Qoranic* texts—those texts of which Mr. Luke so pleasantly tells us.

One of the charms of *Anatolica* is that its writer appreciates the responsibilities of the modern western administrator ; we industrial berserkers, who are, often without our knowing it, making such havoc of an ancient order. The picture he draws, as those who have been out there can testify, is that of a dying civilisation in the process of being repainted, or coated in the veneer of another civilisation, whether dying or not we are ourselves uncertain. The interest is that, as a result of the contact between the two, we are experiencing the uncertainty. This, however, is sure, that it is only by a combination of the finer qualities in both that the new can be established. The perpetual protest against the drab uniformity we bring is patent to all. Ours is the smutch of black and khaki upon the beauty of the Orient. I was once at a reception of the Egyptian Sultana, in Alexandria, and that also is Mr. Luke's Anatolica. The *Suras* of the Prophet were superbly chanted by *Immans* in Egyptian silks, the coffee was handed round in *zarfs* of gold, everything was lovely, but as a concession to western proprieties, the chief eunuch, who ordered the ceremony—he was over seven feet high and doubtless chosen on that account—was dressed in a long black frock coat so that he looked like a misfitted shopwalker out of an "emporium." One felt that the liability was limited, but the power for expar siveness and dark destruction infinite. We still carry with us wherever we go this curse of colourlessness ; and perhaps the more we learn of the vanishing beauty of the Orient the better we shall understand what it is we bring, for good or evil.

Mr. Luke's heart, it is evident, is in Cyprus, where, indeed, some of his best work has been done, and where

* *Anatolica*. By C. H. Luke, Assistant Governor of Jerusalem. (Macmillan and Co. 1924.)

many of his friends who have drunk the Comanderia with him hope he may some day be again. His charming words on the isle of Aphrodite make one wish he had threaded a little more of the golden strand of Hellas through his chapters, for was not the Byzantine Church the end of the great dream of Hellas—the turning within of a civilisation complete in itself? It was the last creative effort of the Greek spirit, when it realised its failure to master, by absorbing it, the endless onrush of barbarism; and the happy humanist in Mr. Luke makes him well aware that the fight is till going on, and that the best English administrators are usually those who have in them the ever living light of Hellas. So in his *Anatolica* the author has made, without, I think, being quite conscious of what he has done, a substantial contribution to a subject we are only just beginning to understand—the history of Mediterranean civilisation. Where so much has been given perhaps it is ungracious to ask for more, but there are some things which in his book we miss.

We should, for instance, have liked more about Venice and that shameless overthrow of the Greek Empire that had so much to do with the coming of the Turk later into Europe; we should like to have had more about Norman work in Sicily, and the link between Sicily and Cyprus; we should like to have had more about St. Francis and the Franciscan spirit, for was St. Francis not a part of Anatolica when he went off to convert the Sultan Al Kamil? we should have liked a little more as to the part that France played in the Near East, of de Joinville, who described it more exquisitely than any man has ever done; and why not something of St. Louis himself, his building work in Syria, his dealings with Al Moadam and Octai, all that is a part of Anatolica; and, above all, why not something of our own Edward Plantagenet, for it was he, the first English king, who saw that, as a result of the disaster of St. Louis and the fall of Bagdad, the Crusades had come to an end? From that moment, when Edward I. returned to Sicily, when modern England and modern France were born, when the West and the East lost touch, Europe turned in upon herself and that nationalising began which culminated in the Great War. And all this is written in the architecture. Our current generalisations, and all the nomenclature of the schools are out of date in the light of our modern knowledge of Mediterranean civilisation and the relation of East and West. Some day, if Mr. Luke adds another chapter to his book, will he not give us one on the beginnings of militant Christianity in the Near East, when after the fall of the Western Empire, the second great civilising effort of the West began, when the Byzantine and Persian cultures met; and we get all those curious and interesting forms, the early Georgian buildings, the fortified monasteries, etc., of which he tells us, a development that also was checked by the catastrophe of the fall of Bagdad, where the traditions of Græco-Roman civilisation had been carried on until the suppression of the Motazilites? All this is Anatolica, that "Museum of the races," as Mr. Luke calls it, or in an even happier phrase "that inextricable confusion of Christianity and Islam with a top dressing of modern thought, and substantial foundation of paganism."

It is to be hoped that Mr. Luke's book will run into many editions, but if he reissues we would urge him to add either a short key chapter that shall give the salient points of Mediterranean history, or, better still, give us a table of dates where the historical outlines, the personalities, and the architecture he records may be set side by side. We should enjoy his book ever so much more if he did not so strain our imagination and so test our ignorance.

Correspondence

HOUSING.

21 *Suffolk Street, S.W.*1.
18 *November* 1924.

To the Editor, JOURNAL R.I.B.A.,—

SIR,—From the time when the Addison fiasco was first mooted I have openly expressed my conviction that no solution of the housing problem is possible which does not embrace:

1. The protection and extensive employment of unorganised, untutored and unfettered labour.
2. The suspension of legislation inimical to the natural development of building enterprise.

Although this conviction seems to be shared by a great majority of those with whom I have discussed it, I understand that it is not held by some eminent architects whose views have undoubtedly influenced the abortive housing policies of three successive Governments.

To a community lacking bread, a scarcity of skilled bakers would not appear to be an adequate reason for starvation, nor would expert efforts to refine its diet afford any comfort to its members.

That a sufficiency of houses can be built to our standards without wounding the susceptibilities of organised labour is questionable, but that insistent pursuit of this ideal is obstructing the building of houses in which men and women could live in comfort, health and decency is unquestionable.

In a matter of such national importance it is right that the considered opinions of even a small minority of architects should be represented and carefully weighed by those responsible for any measures taken in this cause, and with this object I invite any members of the profession who may share my views to communicate with me at this address.

Yours faithfully,

JAMES RANSOME [*F.*].

The Late Sir Thomas G. Jackson, Bart., R.A., Royal Gold Medallist R.I.B.A.

BY SIR REGINALD BLOMFIELD, R.A.

The death of Sir Thomas Graham Jackson leaves a gap not easily to be filled in the ranks of the architects of this country. In the memoir given in *The Times* he was very properly described as a great English architect ; and he was great, not only by his skill as an architect and his literary ability, but also by reason of the fact that throughout a long and successful career he never failed of his own high ideal as an English gentleman. The history of art shows that these qualities do not always go together ; there have been artists of outstanding ability who have stained their record by unscrupulousness in practice. Jackson was not one of these. Rather imperious by nature, and perhaps by training and traditions inclined to be autocratic, he never failed in courtesy and consideration for others ; and I recollect, many years ago, a friend of mine, of distinguished ability, who differed from him *toto cælo* in his views of architecture, saying that in spite of this he considered Graham Jackson an ornament to the profession.

Since those days when Shaw and Jackson were the recognised leaders of all who regarded architecture as an Art and as something more than a profession, the point of view seems to have shifted, and not entirely for the better. The architect and scholar is somewhat at a discount. In our Schools the study of the great work of the past, which after all must be the basis and starting point of all real movement forward, has been neglected in favour of contemporary fashions of design. It was not so in the days of men whom we shall yet regard as great architects when the latest vagaries of our Schools are forgotten ; men such as Decimus Burton, Inwood, Cockerell, or Charles Barry. These men went through years of apprenticeship and study of old work before they considered themselves qualified to design. Nowadays a rush to the Continent or to America is considered adequate, with the results that are seen in the design of most of the commercial buildings of the present day. Against such futility Jackson made a resolute stand. He studied old work persistently and with genuine affection. Owing to his early training in a " Neo-Gothic " office, he never quite shook himself free of the sketch-book habit of design, design, that is, mainly preoccupied with details. And indeed he always seemed to me to have rather misconceived the meaning of Renaissance architecture, regarding the work of the ornamentalists as architecture, when he should have ignored those ingenious tradesmen, and concentrated his attention on the real architects, Bramante, Peruzzi, Michael Angelo, Vignola, Palladio, and their followers in France and England.

But from first to last architecture was always to him the Art of arts. He devoted his literary ability and untiring industry to the study of its history His admirable work on Dalmatian Architecture is a classic, and in the closing years of his life he undertook, and had gone far to complete, an account of Western architecture, from the fall of Rome right down to the eighteenth century. His work as an architect is familiar to all of us, and more particularly to Oxford men. When I was an undergraduate at Oxford forty-five years ago the Schools were building, and much of his work in the Colleges was completed Even we undergraduates felt that he had caught the spirit of seventeenth-century Oxford as no other man could have done, for in fact Graham Jackson was steeped in the best Oxford tradition, that fine tradition of Humanism which is beyond all price, and was never so badly needed as it is to-day. A fine architect and a fine character, all architects will mourn his loss.

NEW BUILDINGS AND OTHER WORK BY SIR THOMAS JACKSON.

OXFORD.—*Colleges :* Balliol, new fellow's house (King's Mound) ; Brasenose, new buildings ; Christ Church ; Corpus, new house ; Hertford, chapel, bridge over New College Lane and other new buildings (still in progress) ; Lincoln College ; Merton College ; Oriel College ; Queen's College ; Trinity, new buildings ; Wadham College.

The new Eaxmination Schools ; Ackland Home ; boys' high school ; girls' high school ; Radcliffe Library ; electrical laboratory ; cricket pavilion. Also restorations and other work at All Saints' Church, Bodleian Library, Carfax Tower, Clarendon Press, Frewin Hall, St. Mary's Church, Sheldonian Theatre, Radcliffe Observatory, Radcliffe Infirmary, Radcliffe Camera.

Schools : Radley (chapel, dining hall, memorial gateway and other buildings) ; Giggleswick (chapel) ; Brighton College (new buildings and enlargement of the chapel) ; Eton (cricket pavilion, racquet courts, science schools, music school, Lawson Museum) ; Westminster ; Harrow (master's house) ; Rugby (new Speech Room) ; Uppingham (new buildings) ; Cranbrook ; and Sandwich.

New Buildings at Cambridge.—Sedgwick Museum, Law Library, Law School, Archæological Museum, Physiological Museum, Psychological Museum.

New Churches.—Annesley Church ; Hornblotton Church ; Curdridge Church ; Narbeth Church ; Northington Church ; Stratton Church ; Wimbledon, St. John's ; Wimbledon, St. Luke's ; Norfolk Island.

Hospital for Children with Hip Disease, Sevenoaks ; Wimbledon Hospital ; Barnet Library.

Restorations and Additions at the following.—Aldershot Church ; All Saints, Stamford ; Ashbourne

Church; Ash Church, Sevenoaks; Sevenoaks Parish Church; Bath Abbey (new cloisters, still in progress); Canterbury Cathedral (monument to Archbishop Benson); Duddington Church, Northants; Farnham Castle Chapel; Grimsby Church; Hereford Cathedral; Hampstead Church; Malvern Priory; Mold Church; Portsmouth Parish Church; Ripon Cathedral; St. Cross Hospital, Winchester; St. Michael's and St. Peter's Churches at Bournemouth; Hagley Church; Laverstoke Church; Worcester Cathedral; Stapleford Church, Notts; Wimbledon Parish Church; Whitchurch, Hants; Wrexham Church; Christ Church Priory; Winchester Cathedral.

Also at Durham Castle; Danby Hall, Yorkshire; Laverstoke House, Longleat; Eltham Palace; Montacute House; Catton Hall; Royal Academy; Greenwich Hospital; Drapers' Hall; Inner Temple; Rushton Hall; Rothamsted; Nottingham Castle, etc. Also the Campanile at Zara.

Review

REPORT OF THE BIRMINGHAM CIVIC SOCIETY. *June* 1923–*June* 1924. *Price* 1*s.* 6*d.*

It is perhaps not so strange as it may superficially appear that Birmingham, which has had for the last couple of generations a highly developed sense of civic responsibility and an active and well organised municipality, should, nevertheless, be one of the dreariest and most chaotic of the large towns in England. The reason is—if a generalisation upon so big a subject be permitted—because the value of beauty and order in daily life has not been appreciated by those who restricted their efforts to the realms of morality and ethics. Birmingham epitomised the Victorian virtues. Rich and affluent citizens were acutely aware of their responsibilities and ungrudgingly gave of their time and money to the fulfilment of them. But the achievement of beauty in everyday life was, until recently, not one of them. The formation of a civic society was the first public recognition of a changed outlook, and the subsequent growth and extension of that society's activities is a good sign that such recognition is welcomed and appreciated.

Foremost among the Society's successful achievements must be reckoned the formation of the Advisory Art Committee. The Society alone was not responsible for this, but its efforts were the most important factor in the establishment of the Committee, which is now officially recognised by all the various committees of the City Council. This, however, is an earlier success with which the present report does not deal. During the year ending June 1924 the most important work of the Society was its campaign in support of the Repertory Theatre. In November 1923 it was announced that the Repertory Theatre would be obliged to close in the following February owing to insufficient support. The Society at once took the matter up, organising a powerful committee representative of every interest in the City, and entered into a vigorous publicity campaign. At the time when the report went to press it was uncertain whether the Society's efforts had been successful. There is no longer any doubt, since at the time of writing a season is in full swing and a very serious loss to the intellectual and æsthetic life of the City has been averted.

The Society's work during the past year includes the planning of various park lay-outs, but one of its activities is of more than local importance. During the previous year the Society was engaged in an attempt to improve the appearance of public telephone kiosks. The matter was subsequently brought before the Director of Telephones by Mr. William Haywood, the Society's indefatigable honorary secretary, with the result that various models are now to be erected outside the National Gallery for comparison. This is surely a matter of some importance, for the amenity of our towns depends in no little degree upon the appearance of street appurtenances, pillar boxes, lamp standards, telephone kiosks, underground stations, public conveniences, public vehicles and the like. Untidiness, even more than bad architecture, is responsible for the ugliness of our towns. Along these lines there is much scope for a Civic Society, especially since such a process of tidying up does not necessitate a great expenditure. But perhaps most important of all is the ridding of the town of smoke and fog. We have only to travel abroad to know that this can be done. If Birmingham, through its Civic Society, would show England the way, its fame would surely be established for all time.

H. J. Birnstingl [*A.*].

THE ARCHITECTURE CLUB.

Annual General Meeting.

The second Annual General Meeting of the Architecture Club was held on 18 November, 1924, in the Meeting Room of the R.I.B.A. by kind permission of the Council.

Mr. J. C. Squire, who occupied the chair, gave an account of the Club's work during the last twelve months, and outlined the scope of its immediate activities in the future. Mr. Squire said that the principal activity for the past year had been holding the Spring Exhibition at Grosvenor House, kindly lent by the Duke of Westminster. Although the Exhibition was itself successful by reason of the fine collection of architectural works shown, it was a disappointment from the point of view of attendance; the total number of visitors being half that of the 1923 Exhibition. This was due in a large part to the unsettled conditions attending a change of Government, followed by a traffic strike which commenced a few days after the opening. The result was a serious financial loss to the Club.

The Chairman made particular reference to the fine speech of the Marquis Curzon of Kedleston, who opened the Exhibition, and to the visit of Her Majesty the Queen, accompanied by her brother, the Marquis of Cambridge, who is a member of the Club.

The Chairman enumerated other activities during the year, including the fact that the British Empire Exhibition authorities approached the Architecture Club with a request for their assistance in organizing a representative exhibition of British Architecture in collaboration with the Royal Institute in May. The Club also co-operated with the Institute in the matter of St. Paul's Bridge, and took an active part in the organized protest that was made by the leading artistic bodies of London. The Chairman referred to the fact that these activities with the Institute showed the happy relations which had existed between that body and the Architecture Club.

In the matter of City churches, the assistance of influential persons in opposing the scheme for removing certain of Wren's churches was obtained, and it was a cause of great gratification to feel that they, with others, had been instrumental in stopping the scheme of demolition which was under consideration.

The Club appointed a Press Sub-Committee under the Chairmanship of Mr. James Bone. Through this Committee efforts have been directed towards obtaining proper mention of the architects' names in any press reference to architecture. They have obtained information on all matters relating to new buildings, which is placed at the disposal of editors of daily papers.

The Sub-Committee is at present busy on important propaganda work on the question of the control of advertisements on buildings.

The Exhibition Sub-Committee has been fully engaged in the organization of the exhibitions at Grosvenor House and at Wembley, previously referred to. They have decided that it would not be desirable to hold another exhibition next spring, but are at present considering the question of one in the autumn of 1925.

A Club visit was held during the year to the Bush Building, when the architect, Mr. Harvey Corbett, kindly conducted a large number of members over his work.

The Club has held three dinners during the year, at the first of which Mr. Curtis Green was the Guest of Honour, on the occasion of his election to the Royal Academy. At the second dinner Mr. Paul Waterhouse was entertained on the termination of his Presidency of the Royal Institute. At the third dinner the toast "Architecture" was proposed by the late Prime Minister in a remarkable speech, and was replied to by the President of the Institute, Mr. J. A. Gotch.

The Chairman also referred to the steadily growing membership of the Club, which has now reached a total of 271 out of a full complement of 300 permitted by the Rules. He referred to the loss by death of two well-known members, Mr. J. Annan Bryce and Mr. A. Clutton Brock. The Chairman, having thanked retiring members of the Committee and the Hon. Treasurer for their work, said that during the period under review there had been a marked increase in the interest shown in architecture, and a greater measure of accuracy and intelligence in criticism by the lay Press and the public. This was largely due to the propaganda work of the Club, which had fully justified its existence.

The Report and Balance Sheet, having been proposed by Mr. Howard Robertson and Mr. P. D. Hepworth, were adopted unanimously.

The meeting then proceeded to the election of new members of the Committee and an Honorary Treasurer for the ensuing year, and after some discussion on matters of general policy the meeting terminated with a cordial vote of thanks to the Chairman, and to the Secretary, Mr. Elder Duncan.

H. Austen Hall [*F.*].

SOME ENGLISH CATHEDRALS AND STONE DECAY.

Lecture delivered by Professor A. P. Laurie to the Students of the Royal Academy, London, on Wednesday, 19 November 1924.

Professor Laurie began by stating that for some years he had been making observations at the request of the Office of Works on the stone decay taking place in our ancient monuments. During this time he had collected a good deal of interesting information, and during the last summer he determined to visit some of our cathedrals with a view to collecting further facts.

The cathedrals visited were Durham, Lincoln, Ely, and Norwich, and in addition he re-examined the condition of the stone at Hampton Court and the Houses of Parliament, and paid a visit to Westminster Abbey.

Before speaking of these buildings he began by referring to the ruins of Elgin Cathedral. In order to understand what is happening here and elsewhere it is necessary to classify the stones used for building into three main groups: Lime-stones, sand-stones in which the quartz particles are united by calcite, and sand-stones in which the particles are united by silica. This classification would be regarded by petrologists as wanting in detail and being somewhat diagrammatic in character, but it will be most convenient for the present purpose, which is the injury caused to modern buildings by the presence of sulphur dioxide in the air produced by the burning of coal. The ordinary causes of stone decay do not require special mention as they are well known to architects and builders, but the new and the main cause of the rapid decay which takes place in modern buildings is the attack on the calcium carbonate of the lime-stone and of the calcite forming the binding material in sand-stones by sulphur dioxide in presence of air and moisture forming calcium sulphate. Calcium sulphate is slightly soluble in water, and therefore is being slowly dissolved in the rain and removed, but this is not the most serious cause of damage. Cases of rapid decay are found to be associated with the crystallisation of calcium sulphate inside the stone and the consequent breaking up of the stone. The lecturer showed micro-photographs of calcium sulphate crystals and magnesium sulphate crystals from Ely and from the Houses of Parliament respectively, and described experiments for producing the same effect in the laboratory.

Proceeding then to deal in detail with the stone decay taking place at Elgin, Durham, Lincoln and Ely, he directed attention to the fact that in some cases where siliceous sand-stones had been used the source of lime must have been the mortar, the rain dissolving and washing the lime into the stone. He also showed from analyses at places like Ely and Tintern Abbey that the destruction due to sulphur dioxide was not confined to towns, but was spread over remote country districts.

Finally he stated as the result of the evidence collected that probably the best thing that could be done would be to treat such stone surfaces with a binding material depositing silica cement, and periodically to wash down the building with water during the summer with a view to removing the excess of sulphate of lime and thus diminish the danger of crystallisation. While it was not possible in the state of our present knowledge to say whether such washing could be safely applied to every variety of lime-stone, experiments in this direction were well worthy in his opinion of the serious consideration of architects.

Legal

HIGH COURT OF JUSTICE.—KING'S BENCH DIVISION.*

HOUSING SCHEME: ARCHITECT'S FEES.

ELKINGTON V. MAYOR OF BOROUGH OF WANDSWORTH.

(Before Mr. Justice Branson.)

In this action his Lordship decided in favour of the defendant council on the principles to be applied in estimating the remuneration to be paid to the plaintiff, Mr. Hylton Basil Elkington, F.R.I.B.A., for services as architect to the defendant council in the construction of houses on the Furzedown estate, authorised by the Ministry of Health. The two points to be decided were :—(1) What was the proper remuneration to be paid for the houses erected ; and (2) what was the right amount owing where the work had been abandoned.

JUDGMENT.

His LORDSHIP, in his judgment, said that the facts were not in dispute. The plaintiff was given advances from time to time, and now he claimed that a balance of £3,215 was owing to him. The defendants raised two objections to his claim :—(1) That the calculation of his fees for the 153 completed houses was on an erroneous basis ; (2) that the amount due for the 247 houses which had been abandoned should be on a *quantum meruit*. The question depended on the construction of the contract. Unless there were special circumstances the terms set out in the General Housing Memorandum No. 4 were to apply. Clause C of that memorandum applied to the present case. This provided for a payment of 5 per cent. on the first 12 cottages, 2½ per cent. on the next 60, and 1½ per cent. on the remainder. This scale covered the ordinary varieties in types of houses, and modifications made to avoid monotony. The plaintiff claimed 5 per cent. on those houses for which contracts were first signed in point of time. The defendant council contended that he should receive 5 per cent. on 12 houses, 2½ per cent. on 60 if that number were built, and 1½ per cent. on the remainder. Reading the document as it stood, the defendants' contention seemed to be the correct one.

Why should an architect's remuneration depend on whether the more expensive houses were the first to be ordered ? This interpretation was assisted by the fact that the words were first, next, and remainder, and not first, next, and subsequent. It could not be said that the memorandum of the Royal Institute of British Architects was incorporated in Memorandum No. 4 in the ordinary sense of that term. The former memorandum was divided into two parts, conditions of engagement and scale of charges. Nothing would have been easier than to contract under that scale instead of Memorandum No. 4, but this had not been done. The true interpretation of Memorandum No. 4 was that the memorandum of the Royal Institute of British Architects might be looked at to see what the conditions of engagement were, but the scale must be according to that laid down by the Ministry of Health. On this point the defendants' contention was correct.

The plaintiff also claimed to be entitled to be paid for the abandoned work two-thirds of what he would have received had the work been completed. His contention was that the scale of charges for abandoned work was to be in accordance with the memorandum of the Royal Institute of British Architects as modified by Memorandum No. 4 which, when properly construed, states what the scale is to be.

In his opinion the former memorandum did not provide a scale at which an architect was to be paid, but only provided for the time at which an architect was entitled to be paid for work which might not, in fact, have been abandoned at all. If the plaintiff's contention was correct he would be entitled, under the memorandum of the Royal Institute of British Architects, to charge 6 per cent. where the contract was for over £6,000 if the work had been abandoned. He did not seek to maintain such a position. The true interpretation was that the plaintiff was entitled to payment on a *quantum meruit*. The principles on which payment was to be made must be in favour of the defendants' contentions.

If the parties were unable to agree on the figures the matter would be sent to an official referee.

* From *The Times*, November 14th.

NOTES FROM THE MINUTES OF THE COUNCIL MEETING.

November 3rd 1924.

ARCHITECTURE AND CRAFTSMANSHIP.

The following recommendations passed by the Art Standing Committee were approved by the Council :—

1. That an additional Committee be formed, the purpose of which shall be to foster the best interests of the Crafts connected with the construction, decoration and equipment of buildings.

2. That the Allied Societies be invited to form local Committees with a similar object in their districts.

3. That one evening in each Institute Session be devoted to the reading of papers and discussion on subjects relating to Craftsmanship.

4. That short lectures of a popular kind be arranged for, from time to time, at Conduit Street, and locally by Allied Societies.

5. That the Board of Architectural Education be invited to consider whether more can suitably be done to assist the understanding of craft processes and the right use of material in the education of students.

R.I.B.A. Visiting Board.

The reports on the following Recognised Schools were approved and ordered to be transmitted to the authorities of the Schools :—

The School of Architecture, The Royal West of England Academy, Bristol.

The School of Architecture of the University of Cambridge.

The School of Architecture of the University of Liverpool.

The School of Architecture of the University of Manchester.

R.I.B.A. Examinations.

On the recommendation of the Board of Architectural Education a revised syllabus was adopted for the Intermediate and Final Examinations.

Recognised Schools Medal.

On the recommendation of the Board of Architectural Education the medal for the best set of designs submitted at the Annual Exhibition of Designs of Students of Recognised Schools exempted from the Final Examination was awarded to Miss Elsie Rogers (School of Architecture, Manchester).

Archibald Dawnay Scholarships.

On the recommendation of the Board of Architectural Education the following awards were made :—

R. H. Turner (Liverpool), £50 Scholarship.

A. C. Cameron (A.A.), £25 Scholarship.

Grants of £20 each—

G. A. Burnett (Leeds).

I. R. Erith (A.A.).

A. C. Todd (Liverpool).

R.I.B.A. Scholarships at the School of Architecture, Cambridge.

The Scholarships were awarded as follows :—

First Year : Miss Norah Aiton, Girton (£35).

Second Year : Mr. Edward Le Bas, Pembroke (£35).

The University of Leeds.

Mr. W. Alban Jones, President of the Leeds and West Yorkshire Architectural Society, and Mr. H. S. Chorley [*F.*] have been appointed as Delegates of the R.I.B.A. at the coming-of-age celebrations of the University of Leeds.

The London Survey Committee.

A special grant of ten guineas was made in aid of the work carried on by the London Survey Committee.

The Architects' Benevolent Society.

The usual Annual Grant of £100 was made to the funds of the Architects' Benevolent Society.

R.I.B.A. Visits.

The members of the Architecture Club were invited to take part in the R.I.B.A. visits to buildings, etc.

Boards and Committees.

The following appointments were made :—

L. Sylvester Sullivan, Board of Architectural Education.

George Drysdale, Board of Architectural Education.

E. J. Sadgrove, Royal Gold Medal Committee.

L. H. Bucknell, Competitions Committee.

T. Taliesin Rees, Housing Committee.

Registration.

The following were invited to serve on the Registration Committee :—

R.I.B.A.—

Major Harry Barnes, Arthur Keen, G. C. Lawrence, Percy Thomas, W. Gillbee Scott, J. Alan Slater.

Society of Architects—

A. J. Taylor, Noel. D Sheffield, C. F. Skipper, L. Sylvester Sullivan, E. J. Partridge, Thomas Wallis.

The Committee was given power to appoint, at their own discretion, a number of Advisory members as representatives of the Allied Societies and of other bodies and interests affected.

Alleged Overcrowding of the Profession.

The following members were appointed to serve on a Joint Committee (with representatives of the Architects' and Surveyors' Assistants' Professional Union) to enquire into the alleged overcrowding of the profession: Mr. Arthur Keen, Mr. Maurice E. Webb, Mr. Francis Jones.

Retired Fellowship.

Mr. F. H. Tulloch (elected Associate 1889, Fellow 1902) was transferred to the Retired Fellowship.

Fellowship.

Mr. H. S. Rogers, M.A., F.S.A., of Oxford, was elected to the Fellowship.

The Allied Societies.

The new draft Bye-laws of the Devon and Exeter Architectural Society were approved; the affiliation of the Burnley District Society of Architects with the Manchester Society of Architects was approved.

Pupils in Office.

On the recommendation of the Board of Architectural Education the Council decided to recommend Members and Licentiates of the Royal Institute not to accept pupils until they have been registered as Probationers R.I.B.A.

The Examinations

R.I.B.A. INTERMEDIATE EXAMINATION.

Testimonies of Study.

The Council have approved the following revised regulations for the Testimonies of Study to be submitted by candidates for admission to the Examination :—

(*a*) The Orders.—A façade or part of a façade of a building of recognised importance, showing the application of one or more of the Greek, Roman or Renaissance Orders of Architecture. The student must state his authority for the Order and the building which should not be of recent design.

Sheet 1 : A general drawing of the building, sufficient to illustrate the application of the Order or Orders, with section of the façade wall, and plans of the façade wall in the storeys where the Orders occur.

Sheet 2 : Details of the Order or Orders.

(*b*) Freehand Drawing.—*Sheet* 3 : Classic Ornament or Mediæval Ornament. Freehand drawing from the round.

(*c*) Measured Drawings.—*Sheets* 4 *and* 5 : Measured drawings of an existing building or portion of a building not of recent construction to be selected by the candidate. His plottings and sketches are also to be submitted.

(*d*) CONSTRUCTION APPLIED TO ELEMENTARY DESIGN.—Working drawings of a domestic building of moderate dimensions, showing clearly the construction of floors, roofs, joinery, etc.

The quality of design will be considered, and work not reaching a reasonable standard of simple design will be disqualified on that ground.

Sheet 6 : General drawings to a scale of 8 feet to 1 inch.

Sheet 7 : A comprehensive half-inch detail.

Sheet 8 : Some full-size details.

SYLLABUS FOR THE EXAMINATION.

The following revised syllabus is also approved :—

Friday (10—1, 2.30—5.30).—The title only of the Design Subject will be announced to candidates on Friday morning at the beginning of the examination.

(*a*) 1. A paper on the General History of Architecture. 2. A specialised paper on the History of Architecture of *one* of the following periods, to be selected by the candidate : (*a*) Greek and Roman ; (*b*) Byzantine and Romanesque ; (*c*) French and English Gothic ; (*d*) Italian, French and English Renaissance.

Saturday (10—1).—A paper on the Calculations of Simple Structures.

Monday (10—1, 2.30—5.30).—(*b*) Design.

Tuesday (10—1)—(*c*) *Part 1. Constructional Design and the properties and uses of Building Materials. (2.30—5.30). Part 2.

Thursday.—*Viva voce* examination, etc.

R.I.B.A. FINAL EXAMINATION.

The following revised syllabus has been approved :—

Wednesday (10—5.30).—(*a*) DESIGN for a building of moderate dimensions or a portion of a more important edifice, to be made from particulars given. The drawings to comprise plans, elevation and section, to a small scale with some details to a large scale. Candidates may be required in the Oral Examination to explain the construction of any part of their design, though construction need not be shown in the drawings presented. The manner of completing the drawings is left to the discretion of the candidates.

The subject will be communicated in general terms to the candidates some days before the examination.

Before leaving the building on the first day the candidate must hand in a tracing of his Design, indicating its main lines, which must not be materially departed from in the subsequent development of his scheme.

On the first day luncheon will be available in the building.

Thursday.—(10—1.30) DESIGN (continued) ; (1.30—2.30) interval ; (2.30—5.30) DESIGN (continued).

Friday.—(10—1.30) DESIGN (continued) ; (1.30—2.30) interval ; (2.30—5.30) DESIGN (continued).

Saturday.—(10—1.30) DESIGN (continued) ; 1.30—2.30) interval ; (2.30—5.30) DESIGN (continued).

Monday.—(10—1.30) *(*b*) 1. GENERAL CONSTRUCTION, including shoring and underpinning ; (1.30—2.30) interval ; (2.30—5.30) *(*b*) 2. IRON AND STEEL CONSTRUCTION, REINFORCED CONCRETE.

Tuesday.—(10—12.30) *(*c*) HYGIENE, including Drainage, Ventilation, Heating, Lighting and Water Supply ; (12.30—1.30) interval ; (1.30—4) *(*d*) SPECIFICATIONS AND THE PROPERTIES AND USES OF BUILDING MATERIALS. (4.30—5.30) †(*e*) PROFESSIONAL PRACTICE. (1) Professional conduct : Duties and Liabilities of Client, Architect and Builder : Architect as Agent of Client : Architect as Arbitrator ; (2) Forms of Contract and Contract Documents, including General Clauses in Specifications ; (3) Law of Easements : Rights of Landlord and Tenant, including Dilapidations ; (4) Building Acts and Bye-laws.

These revised regulations and syllabus will come into operation for the Examinations which will be held in June of next year—*i.e.*, 1925.

R.I.B.A. SCHOLARSHIP AT THE UNIVERSITY OF CAMBRIDGE.

The Council have sanctioned the award of the Scholarship this year as follows :—

First Year : Miss Norah Aiton, Girton (£35).

Second Year : Mr. Edward Le Bas, Pembroke (£35).

R.I.B.A. (ARCHIBALD DAWNAY) SCHOLARSHIPS, 1924.

The Council have awarded Mr. R. H. Turner (Liverpool University), who was awarded a Scholarship of £25 in 1923, a Scholarship of £50, and have granted a renewal of the Scholarship of £25 awarded to Mr. A. C. Cameron (Architectural Association) in 1923.

BOARD OF ARCHITECTURAL EDUCATION SILVER MEDAL FOR THE BEST SET OF DESIGNS SUBMITTED AT THE ANNUAL EXHIBITION OF DESIGNS OF STUDENTS OF RECOGNISED SCHOOLS EXEMPTED FROM THE FINAL EXAMINATION.

The Council have approved the recommendation for the award of the Medal to Miss Elsie Rogers (School of Architecture, Manchester).

EXAMINATION IN PROFESSIONAL PRACTICE FOR STUDENTS OF RECOGNISED SCHOOLS EXEMPTED FROM THE FINAL EXAMINATION.

The following have been successful in this examination :—

Mr. G. G. Grant (Architectural Association).
Mr. L. Hiscock (Architectural Association).
Mr. T. S. Barnes (Architectural Association).
Miss S. G. Moberley (Architectural Association).
Miss J. E. Townsend (Architectural Association).
Mr. Aziz Ali (Architectural Association).
Miss A. Farewell Jones (Architectural Association).
Mr. R. J. Willis (Manchester University).
Miss E. Rogers (Manchester University).
Mr. W. H. Owen (Manchester University).
Mr. J. S. Dawson (Aberdeen).
Mr. H. S. Silcock (Liverpool University).
Mr. W. V. Jenkins (Liverpool University).
Mr. R. H. Turner (Liverpool University).
Mr. W. A. Norbury (Manchester University).
Mr. G. F. Shanks (Glasgow).
The Hon. H. A. Pakington (Architectural Association).
Mr. R. E. Enthoven (Architectural Association).
Mr. R. W. Donaldson (Liverpool University).
Mr. C. L. Bloodworth (Liverpool University).
Mr. J. H. Miller (Liverpool University).

* Some of the questions in the papers on Construction may have reference to portions of the subject for Design.

† This paper is also taken by students of Recognised Schools exempted from the Final Examination.

THE SCHOOL OF ARCHITECTURE, THE ROYAL WEST OF ENGLAND ACADEMY, BRISTOL.

The Council have decided, under certain conditions, to recognise the four years part-time course of the School of Architecture, the Royal West of England Academy, Bristol, as exempting from the R.I.B.A. Intermediate Examination.

Notices

THE THIRD GENERAL MEETING.

The Third General Meeting (Business) of the Session 1924–25 will be held on Monday, 1 December 1924, at 8 p.m., for the following purposes :—

To read the Minutes of the General Meeting (Ordinary) held on 17 November 1924, formally to admit members attending for the first time since their election.

To proceed with the election of the candidates for membership whose names were published in the JOURNAL for 18 October 1924 (p. 679) and 8 November 1924 (pp. 27–28).

To consider the following Notice of Motion by Mr. Francis Hooper [*F.*], seconded by Mr. H. D. Searles-Wood [*F.*].

"To request the Council to consider and if thought desirable to approach the Master Builders' Association and the Building Trades Union, and to offer any assistance deemed suitable in furthering the training of craft apprentices."

ELECTION OF MEMBERS.

5 JANUARY 1925.

The following applications for election have been received. Notice of any objection or other communication respecting the candidates must be sent to the Secretary for submission to the Council prior to Monday, 15 December 1924.

AS FELLOWS (3).

LAY : CECIL HOWARD [*A.* 1912], Aldringham, Leiston, Suffolk.

LOWRY : ROBERT [*A.* 1916], 33, St. James's Street, S.W.1 ; Denham Hill, Denham, Bucks.

WRATTEN : EDMUND LIVINGSTONE [*A.* 1902], 18 Queen Anne's Gate, Westminster, S.W.1 ; "White Cottage," Warlingham, Surrey.

AS ASSOCIATES (9).

DAWSON : JAMES STOTT [Passed six years' course at Robert Gordon's Colleges, Aberdeen—Exempted from Final Examination after passing Examination in Professional Practice], 23, View Terrace, Aberdeen.

DONALDSON : ROBERT WEIR, B.Arch. Liverpool [Passed five years' course at Liverpool University School of Architecture—Exempted from Final Examination after passing Examination in Professional Practice], 56, Hertford Road, Bootle, Liverpool.

HISCOCK : LESLIE ROBERT [Passed five years' course at Architectural Association—Exempted from Final Examination after passing Examination in Professional Practice], 44, Wodeland Avenue, Guildford.

NORBURY : WILLIAM ALAN, B.A. [Passed five years' course at Manchester University School of Architecture—Exempted from Final Examination after passing Examination in Professional Practice], Broadmead, Broad Lane, Hale, Cheshire.

OWEN : WILFRED HERBERT [Passed five years' course at Manchester University School of Architecture—Exempted from Final Examination after passing Examination in Professional Practice], 37, George Street, Cheetham Hill, Manchester.

SHANKS : GEORGE FERGUSON [Passed five years' course at Glasgow School of Architecture—Exempted from Final Examination after passing Examination in Professional Practice], 193, Kent Road, Glasgow.

SILCOCK : HUBERT SPENCER, B.Arch. Liverpool [Passed five years' course at Liverpool University School of Architecture—Exempted from Final Examination after passing Examination in Professional Practice], Brandhoek, Walton Road, Stockton Heath, Warrington.

TURNER : RALPH HENRY, B.Arch. Liverpool [Passed five years' course at Liverpool University School of Architecture—Exempted from Final Examination after passing Examination in Professional Practice], "Claremont," St. Andrew's Road, Bridport, Dorset.

WILLIS : REGINALD JOHN, M.A. [Passed five years' course at Manchester University School of Architecture—Exempted from Final Examination after passing Examination in Professional Practice], The School of Architecture, Victoria University, Manchester.

ORDINARY GENERAL MEETINGS.

SESSION 1924–25.

Mondays—at 8 p.m., except where otherwise stated.

1924.

Nov. 3.—INAUGURAL MEETING : President's Address at 8.30.

„ 17.—GENERAL MEETING : "Planning for Good Acoustics," by Hope Bagenal [*A.*].

Dec. 15.—GENERAL MEETING : "Shop Fronts and their Treatment," by Arthur J. Davis [*F.*].

1925.

Jan. 19.—GENERAL MEETING : "Applications in Building and Foundations of Modern Engineering Construction," by Oscar Faber, O.B.E., D.Sc.

Feb. 2.—GENERAL MEETING : President's Address to Students at 8.30.
Presentation of Prizes.

„ 16.—GENERAL MEETING : "Sculpture in relation to Architecture," by D. S. McColl.

Mar. 16.—GENERAL MEETING : "The Corporate Spirit in Architecture," by F. R. Hiorns [*F.*].

„ 30.—GENERAL MEETING : "The Architectural Treatment of Ferro-Concrete," by A. Beresford-Pite [*F.*].

April 20.—GENERAL MEETING : "Natural and Artificial Lighting," by Percy J. Waldram [*Licentiate*].

May 18.—GENERAL MEETING : "The Influence of the Popes on Renaissance Architecture," by Mrs. Arthur Strong.

June 22.—PRESENTATION OF THE ROYAL GOLD MEDAL, at 8.30.

IAN MACALISTER, *Secretary*.

The Architectural Press will be issuing immediately, through their Book Department, a new work entitled *The Principles of Architectural Composition*, by Mr. Howard Robertson, S.A.D.G., F.S.Arc., Principal of the Architectural Association Schools of Architecture. The volume, which is illustrated, is devoted to an elementary study of the underlying principles of architectural composition, and their application to the varied problems with which architects and designers are faced.

Competitions

UGANDA RAILWAY NEW OFFICE, NAIROBI.

Apply to the Crown Agents for the Colonies, 4 Millbank, Westminster, S.W.1. Closing date for receiving designs, 28 February 1925. Assessor: Mr. William Dunn, F.R.I.B.A. Deposit £1 1s.

RECONSTRUCTION OF THE KONINGINNE BRIDGE, ROTTERDAM.

With reference to the announcement of this competition in a recent issue of the JOURNAL, His Majesty's Consul-General at Rotterdam has informed the Department of Overseas Trade that he has received from the Rotterdam municipal authorities a series of 72 questions and answers amplifying and explaining the technical points which arise in connection with the plans.

As a translation would involve considerable time and difficulty His Majesty's Consul-General suggests that any British firm desiring specific information on the subject should communicate with him direct.

BETHUNE MEMORIAL TO THE MISSING.

The Imperial War Graves Commission desire Members and Licentiates of the Royal Institute to be reminded that applications to take part in the above Competition from persons other than those who had signified their intention of competing on or before 1 January 1924 cannot be considered. Due notice of this regulation was published in the Professional Press on various occasions during August and September, 1923.

MASONIC MEMORIAL COMPETITION.

Apply to The Grand Secretary, Freemasons' Hall, Great Queen Street, W.C.2. Last day for applying for conditions, 23 August 1924. Deposit, £1 1s. Closing date for receiving designs, 1 May 1925. Assessors: Sir Edwin Lutyens, R.A. [*F.*] (appointed by the President); Mr. Walter Cave [*F.*], Mr. A. Burnett Brown, F.S.I.

MANCHESTER ART GALLERY.

Apply to the Town Clerk, Town Hall, Manchester. Closing date for receiving designs, 20 January 1925. Assessors: Mr. Paul Waterhouse, F.S.A. [*F.*], Professor C. H. Reilly, O.B.E. [*F.*], Mr. Percy S. Worthington, Litt.D., F.S.A. [*F.*].

SOUTHPORT: FIRST CHURCH OF CHRIST SCIENTIST; CHURCH AND SUNDAY SCHOOL.

Apply to Messrs. J. E. Sanders & Son, A.R.I.B.A., 219a, Lord Street, Southport. Closing date for receiving designs, 1 December 1924. Deposit 10s. Assessors: Messrs. J. E. Sanders & Son.

Members' Column

CHANGES OF ADDRESS.

MR. A. P. LLOYD (*A.*) has moved from 7 New Square, Lincoln's Inn, W.C.2., to 71 Lincoln's Inn Fields (Telephone: Holborn 1053).

MESSRS. SMEE & HOUGHIN, Architects and Surveyors, have moved from Byron House, 82-85 Fleet Street, to "Fleet House," 58 Fleet Street, E.C.4.

OFFICE ACCOMMODATION.

ARCHITECT, having West End offices, would like to share same with another. For particulars write Box 2122, c/o Secretary R.I.B.A., 9 Conduit Street, W.

APPOINTMENTS WANTED.

A.R.I.B.A. seeks facilities for carrying on own practice in a London office where his occasional assistance could be utilised; on mutual terms.—Box 2532, c/o Secretary R.I.B.A., 9 Conduit Street, W.1.

STUDENT R.I.B.A. desires post in London. Age 23; unmarried. Articled 1919-23, in office where following work was carried out: Hospitals (2), Additions to Public School, Convalescent Home, Public Library, many Banks, Church, and Domestic Work. Salary required, £208 per annum. Apply Box 1211, c/o The Secretary R.I.B.A., 9 Conduit Street, London, W.1.

ASSISTANT RECOMMENDED.

A.R.I.B.A. in the North thoroughly recommends a capable junior assistant who is anxious to obtain a few years' experience in a good London office. Apply Box 1711, c/o The Secretary R.I.B.A., 9 Conduit Street, London, W.1.

Minutes II

SESSION 1924-1925.

At the Second General Meeting (Ordinary) of the Session held on Monday, 17 November 1924, at 8 p.m., Mr. J. Alfred Gotch, F.S.A., President, and afterwards Mr. H. M. Fletcher [*F.*] in the chair.

The attendance book was signed by 24 Fellows (including 9 members of the Council), 35 Associates (including 4 members of the Council), 3 Licentiates and a large number of visitors.

The Minutes of the meeting held on 3 November 1924 having been taken as read were confirmed and signed by the Chairman.

The Hon. Secretary announced the decease of the following members:—

Edwin Seward, elected Associate 1876, Fellow 1889 and placed on List of Retired Fellows, 1921.
William Pywell, elected Associate 1889, Fellow 1905.
William Ernest Barry, elected Associate 1892.

Frank Asquith Brewerton, M.C.,	elected	Associate	1913.
John William Cockrill	,,	,,	1888.
Francis Eldred Lodge Harris	,,	,,	1887.
Robert Brodie Mather	,,	,,	1881.
Thomas James Peters	,,	,,	1921.
Arthur Thomas Philp	,,	,,	1918.
Edward Henry Rouse	,,	,,	1921.
Francis Ross Bates	,,	Licentiate	1911.
George Ronald Bryce	,,	,,	1911.
Harvey Dyball	,,	,,	1910.
John Whitelaw Lockhart	,,	,,	1911.
William David Towell Munford	,,	,,	1911.
Joseph Perrault	,,	,,	1911.
Walter Shaw	,,	,,	1911.
Cyril Hugh Slatter	,,	,,	1912.
Thomas Winder	,,	,,	1910.

and it was RESOLVED that the regrets of the Royal Institute for the loss of these members be recorded in the Minutes.

Mr. Hope Bagenal [*A.*] having read a Paper on "Planning for Good Acoustics" and illustrated it by lantern slides, a discussion ensued and on the motion of Dr. R. E. Stradling, Director of Building Research, Department of Scientific and Industrial Research, seconded by Dr. Alex. Wood, a vote of thanks was passed to Mr. Bagenal by acclamation and was briefly responded to.

The meeting closed at 10.25 p.m.

R.I.B.A. JOURNAL.

Dates of Publication.—1924: 8th, 22nd November; 6th, 20th December. 1925: 10th, 24th January; 7th, 21st February; 7th, 21st March; 4th, 25th April; 9th, 23rd May; 13th, 27th June; 18th July; 15th August; 19th September; 17th October.